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**FMFM 7-4**

# **FIELD ARTILLERY SUPPORT**



**U.S. MARINE CORPS**

PCN 139 000600 00



DEPARTMENT OF THE NAVY  
HEADQUARTERS UNITED STATES MARINE CORPS  
WASHINGTON, D.C. 20380

27 December 1976

FOREWORD

1. PURPOSE

This publication, FMFM 7-4, Field Artillery Support, sets forth the doctrine, tactics, and techniques to be employed in operations and training within the Fleet Marine Forces.

2. SCOPE

This manual covers the mission, organization, and principles of employment of artillery units in support of Fleet Marine Forces in amphibious operations and subsequent operations ashore.

3. SUPERSESSSION

FMFM 7-4, Field Artillery Support, dated 2 March 1970.

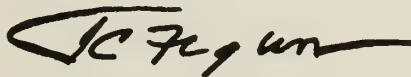
4. CHANGES

Recommendations for improvement of this manual are invited from commands as well as directly from individuals. The attached User Suggestion Form should be utilized by individuals and forwarded to the Commanding General, Marine Corps Development and Education Command, Quantico, Virginia 22134.

5. CERTIFICATION

Reviewed and approved this date.

BY DIRECTION OF THE COMMANDANT OF THE MARINE CORPS



J. C. FEGAN  
Lieutenant General, U.S. Marine Corps  
Commanding General  
Marine Corps Development and Education Command  
Quantico, Virginia

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From:

To: Commanding General, Marine Corps Development and Education Command  
(Director, Development Center), Quantico, Virginia 22134

Subj: FMFM 7-4, Field Artillery Support; recommendation(s) concerning

1. In accordance with the Foreword to FMFM 7-4, which invites individuals to submit suggestions concerning this FMFM directly to the above addressee, the following unclassified recommendation(s) is(are) forwarded:

a. ITEM #1 (May be handwritten; if more space is required, use additional sheets and envelope.)

(1) Portion of Manual: (Cite by paragraph and/or page number.)

(2) Comment: (Explain in sufficient detail to identify the points of the suggestion.)

(3) Recommendation: (State the exact wording desired to be inserted into the manual.)

b. ITEM #2

(1)

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c. ITEM #3 (etc.)

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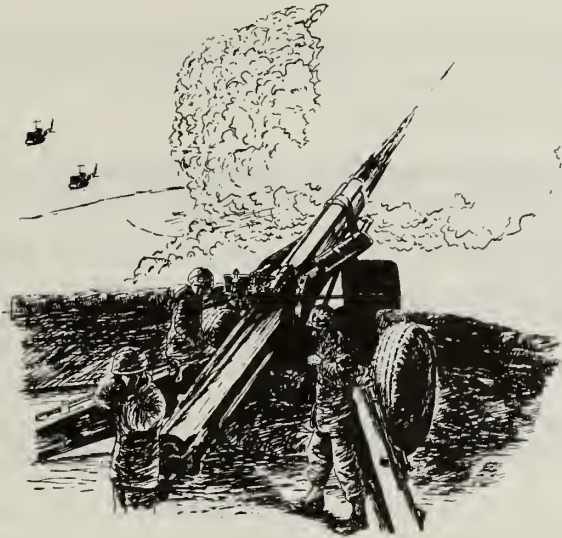
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## CHAPTER 1

### GENERAL

#### Section I. INTRODUCTION

##### 1101. PURPOSE

This manual is written to support the amphibious concepts of the Marine Corps and to provide a source document for the standardization of field artillery tactics and techniques; but it is not intended to restrict the latitude of the commander in the application of unstated procedures. The term "artillery" as used in this manual refers to field artillery unless otherwise indicated. This manual provides the following:

- a. Organization of artillery in the Marine Corps.
- b. Staff and command responsibilities in artillery units.
- c. Artillery staff planning and support of the amphibious operation.
- d. Organization for combat, fundamentals of employment, and tactical employment of artillery.

##### 1102. MISSIONS

Marine Corps artillery has the following general missions in support of the amphibious assault and subsequent operations ashore:

- a. Provide timely close accurate and continuous fire support to elements of the landing force.
- b. Give depth to combat by attack of hostile reserves, restricting movement, providing long range support for reconnaissance elements, and disrupting command and control systems and logistical installations.

c. Deliver counterbattery fires throughout the range of the landing force weapons systems.

### 1103. CLASSIFICATION OF ARTILLERY

Marine Corps artillery weapons are classified as cannon and according to caliber and means of transport as described below:

a. Cannon.--The cannon is defined as a piece of artillery, fixed or mobile, which includes guns, howitzers, and breech-loading mortars. Cannon is also used to define that portion of the weapon required to fire the projectile; that is, the tube, breech mechanism, and firing mechanism of an artillery weapon. The types of ammunition are classified as fixed (generally used in small-caliber gun and recoilless weapons), semifixed (generally used in howitzers and mortars), and separate-loading (generally used in large-caliber guns and howitzers). Among the types of cannon are:

(1) Guns.--A relatively long barrel, low angle of fire, and high muzzle velocity, over 30 calibers in length.

(2) Howitzers.--A medium length barrel, a relatively high angle of fire, and a medium muzzle velocity, 20 to 30 calibers in length.

(3) Mortars.--A short barrel, a shorter range, and a higher angle of fire than a howitzer.

b. Caliber.--Cannon are classified according to caliber by tube diameter. The diameter is normally measured in millimeters. One inch is approximately 25 millimeters.

(1) Light.--120mm and less.

(2) Medium.--121mm through 160mm.

(3) Heavy.--161mm through 210mm.

(4) Very Heavy.--Greater than 210mm.

c. Ground Transport.--Artillery weapons are classified according to method of transport as:

(1) Towed.--Cannon and launchers which are mounted on a carriage designed to be moved as a trailed load by a prime mover. The carriage of a towed weapon contains no power source.

(2) Self-Propelled (SP).--Cannon and launchers which are permanently installed on vehicles which provide automotive power for the vehicle and the weapon.

d. Air Transport.--Artillery weapons may also be classified according to the method of air transportation that can be used to deliver them to a combat area.

(1) Helicopter Transportable.--Those artillery pieces which can be carried by rotary-wing aircraft and landed to permit immediate employment

(2) Air Transportable.--Those artillery pieces which may be utilized in an air movement operation. They may be delivered in any of the following three phases:

(a) Airdrop or Assault Landing (Phase I).--Weapons transportable in assault landing aircraft capable of landing on unprepared surfaces and minimum criteria airstrips in enemy territory. Phase I artillery must be capable of immediate effective employment.

(b) Subsequent Delivery (Phase II).--Weapons transportable in aircraft capable of landing on minimum criteria air-landing facilities under friendly control. All phase II artillery should be capable of effective employment within 1 hour after delivery.

(c) Heavy Air Landing (Phase III).--Weapons transportable in aircraft capable of landing on prepared air-landing facilities under friendly control.

#### 1104. CAPABILITIES OF ARTILLERY

Marine Corps artillery has the organization, fire capabilities, and characteristics to provide timely close accurate and continuous fire support to the landing force. Capabilities of artillery, appropriate for the caliber, are:

- a. Shifting fires of its weapons rapidly within a large area and on a wide front without displacing.
- b. Massing the fires on one or more targets.
- c. Placing indirect fires on targets from firing positions in defilade.
- d. Delivering accurate sustained fires with appropriate ammunition under all conditions of visibility, weather, and terrain.
- e. Delivering fires on targets in defilade.
- f. Delivering accurate fires without adjustment.
- g. Displacing rapidly to new positions.
- h. Destroying point targets using assault and destruction fire techniques.
- i. Conducting direct fire against enemy forces.
- j. Providing battlefield illumination.
- k. Target acquisition.

#### 1105. LIMITATIONS OF ARTILLERY

The following limitations exist to varying degrees in the employment of Marine Corps field artillery:



- a. The principal limitation of field artillery is its inability to support the initial phase of the amphibious assault.
- b. Its effectiveness is reduced and its vulnerability is increased during displacements.
- c. It is vulnerable to enemy air and counterbattery fire.
- d. Effectiveness against moving tanks is low due to the necessity of a direct hit to effectively defeat a single tank.
- e. In mountainous terrain, unobserved fires are generally unreliable, and transfer of fires is difficult.
- f. In an amphibious assault, the exposure of artillery in its initial position areas increases its vulnerability to direct fire weapons.
- g. In the amphibious assault, logistic support may be limited by the artillery unit's ability to transport only a basic allowance in its organic transportation and the handling and transportation of additional ammunition may be restricted due to the weight and bulk of artillery ammunition.

## Section II. ADMINISTRATIVE ORGANIZATION

## 1201. GENERAL

a. Tables of Organization.--The administrative organization of artillery units is established in appropriate tables of organization (T/O). USMCR units may be constituted differently than active USMC units and appropriate T/O's should be consulted. Designation of personnel and service of the piece in the howitzer/gun sections of Marine Corps artillery batteries will be in accordance with the applicable Department of the Army Field Manual; except where the number of cannoners differs from the number shown in the Field Manual, duties will be absorbed by other cannoners as appropriate.

b. Organization for Combat.--Marine artillery units are capable of supporting any size landing or task organization in sustained operations ashore by tailoring their organization for combat to complement the supported force. (See chap. 5.)

## 1202. DIVISION ARTILLERY

The structure of the Marine division provides a field artillery regiment as its primary source of fire support. The artillery regiment is organized administratively to support the operations of the division with components capable of supporting the infantry regiments and their battalions. Current T/O's provide a more detailed discussion of the capabilities of each artillery unit.

a. Artillery Regiment.--The mission of the regiment is to provide artillery support to the Marine division in the amphibious assault and subsequent operations ashore. The regiment is organized into a headquarters battery and three artillery battalions. The artillery battalions are capable of exercising tactical and technical fire direction of organic and attached units. (See fig. 1.)

(1) Headquarters Battery.--This battery provides the regimental commander with the facilities for effective command and control of the regiment in the amphibious assault and subsequent operations ashore. The battery operates only with the artillery regiment. Personnel of the battery

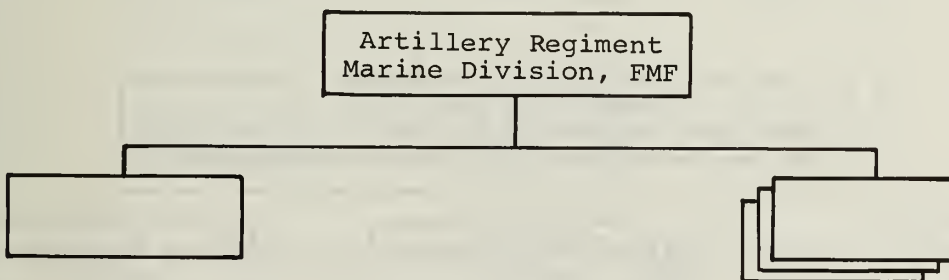


Figure 1.--Artillery Regiment.

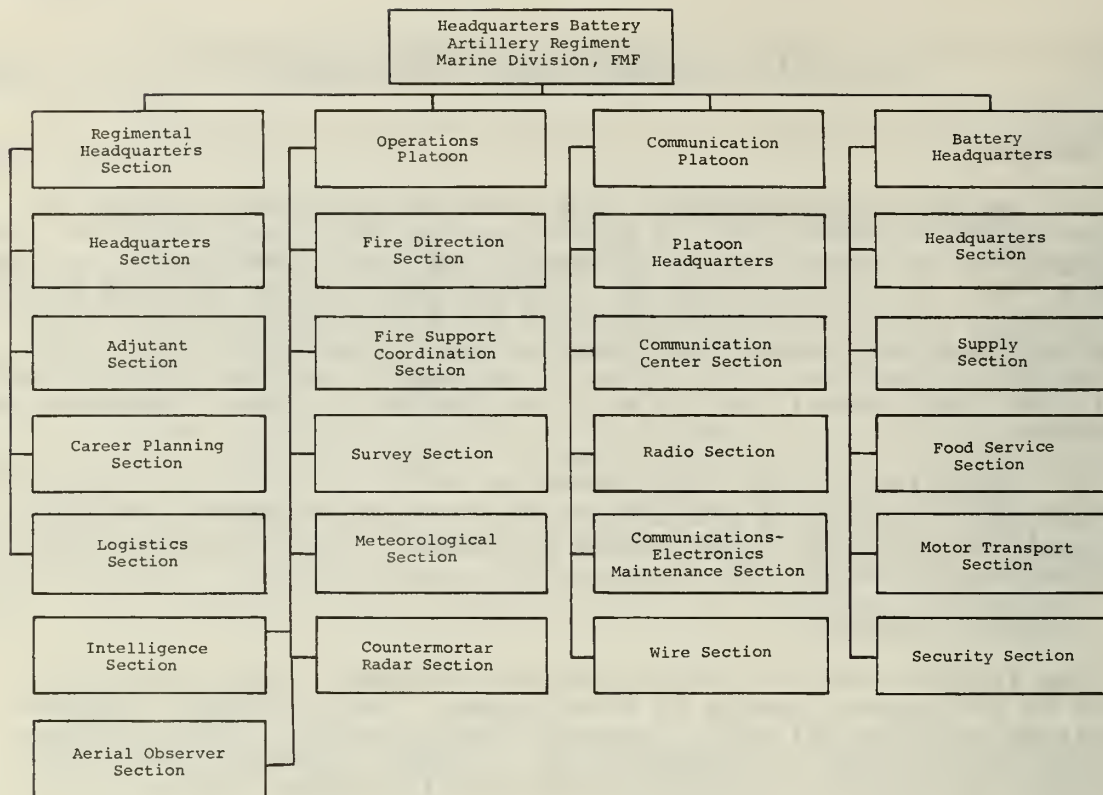


Figure 2.--Headquarters Battery, Artillery Regiment.

may be assigned to a subordinate battalion to provide necessary support when the battalion is operating independently of the regiment. The battery is organized into functional groupings comprising a regimental headquarters, an operations platoon, a communication platoon, and a battery headquarters. (See fig. 2.)

b. Artillery Battalion.--The mission of the artillery battalion is to provide direct support, general support, and reinforcing artillery fires to units of a Marine division. The battalion is organized into a headquarters battery, three 105mm howitzer batteries, and a 155mm howitzer battery (towed). (See fig. 3.) The battalion is normally employed in support

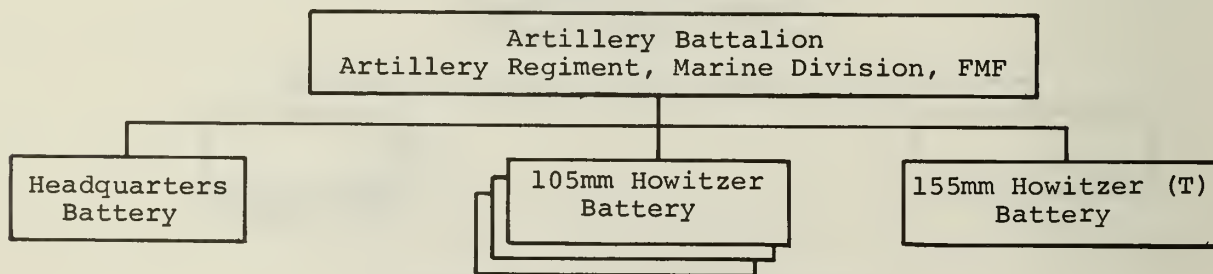


Figure 3.--Artillery Battalion.



of an infantry regiment and will normally operate as an integral unit. The howitzer batteries are capable of operating independently of the battalion when provided appropriate service and support personnel from the headquarters battery. The battalion is capable of exercising tactical and technical fire direction of organic and attached firing units.

(1) Headquarters Battery.--The mission of the battery is to provide the battalion commander the facilities to direct, control, and coordinate the tactical operations of the battalion and provide technical fire direction when ashore. The battery provides limited amounts of service and support for other elements of the battalion. The battery is organized into functional groupings comprised of a battalion headquarters, an operations platoon, a naval gunfire liaison and spotting section, a service platoon, a communication platoon, and a battery headquarters. (See fig. 4.) The battery operates only with the artillery battalion. Personnel of the battery may be assigned to a firing battery to provide necessary support when the firing battery is operating independently of the battalion.

(2) 105mm Howitzer Battery.--The mission of the battery is to provide direct support, general support, and reinforcing fires to units of a Marine division. The battery will normally operate as an integral firing element of the artillery battalion, however, when augmented by headquarters battery, it is capable of deploying with an infantry battalion. The battery is organized into a battery headquarters and a firing battery. Command, control, communications, fire direction, and liaison are executed

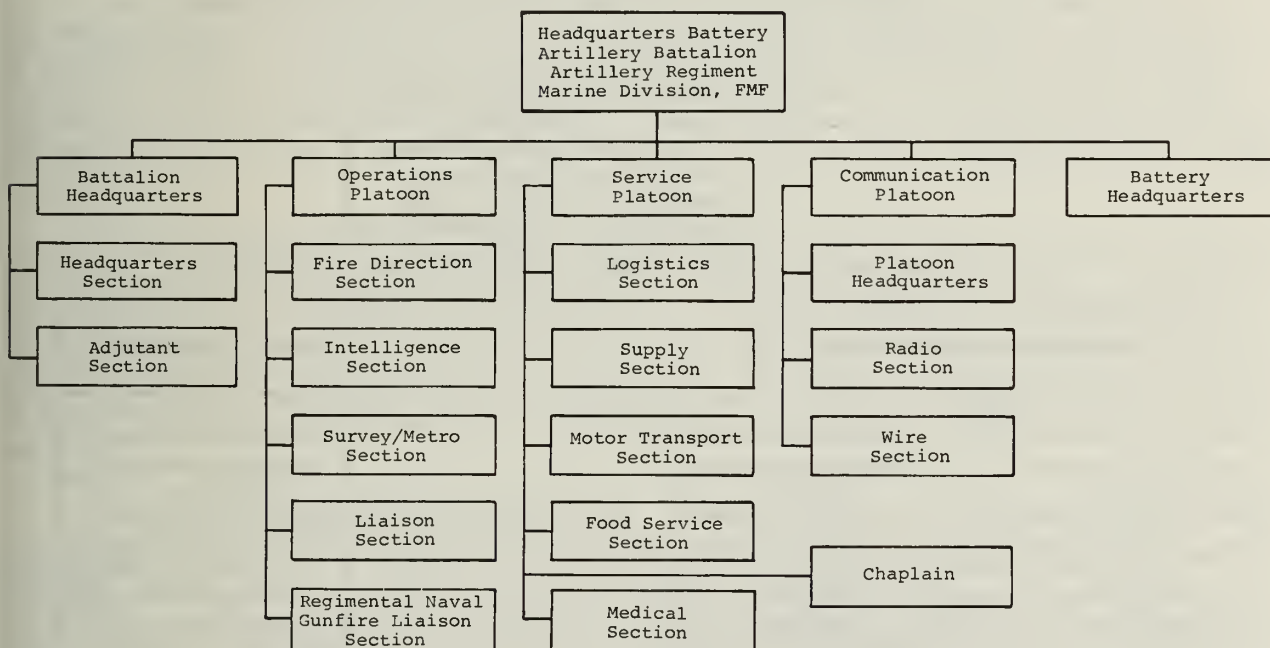


Figure 4.--Headquarters Battery, Artillery Battalion.

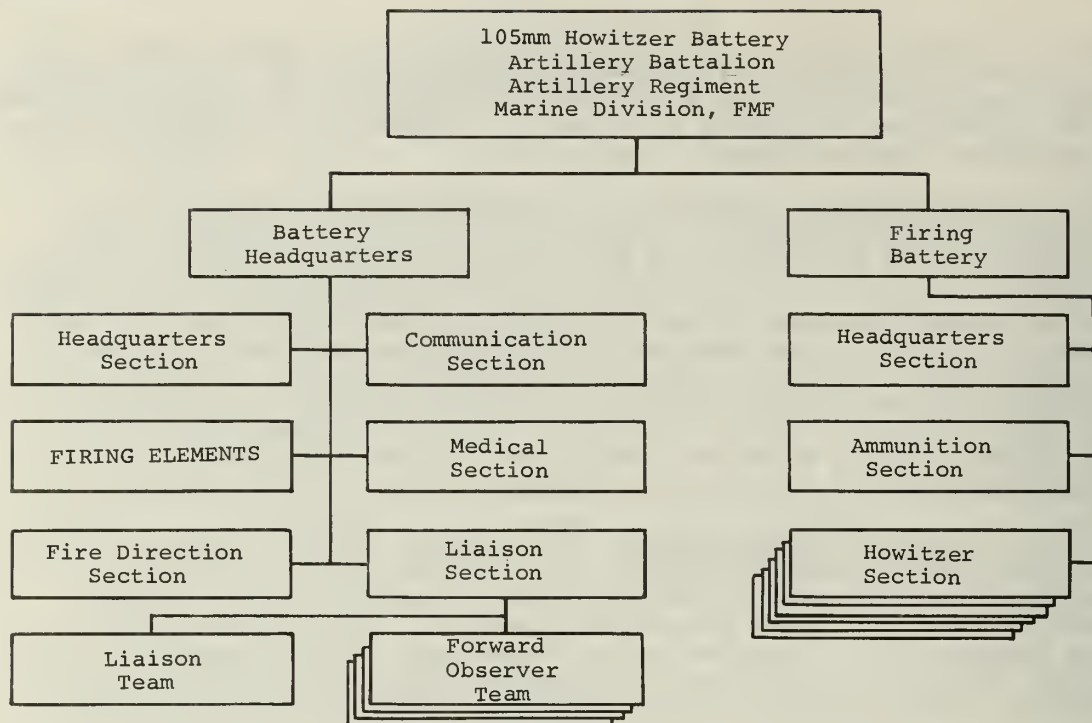


Figure 5.--105mm Howitzer Battery, Artillery Battalion.

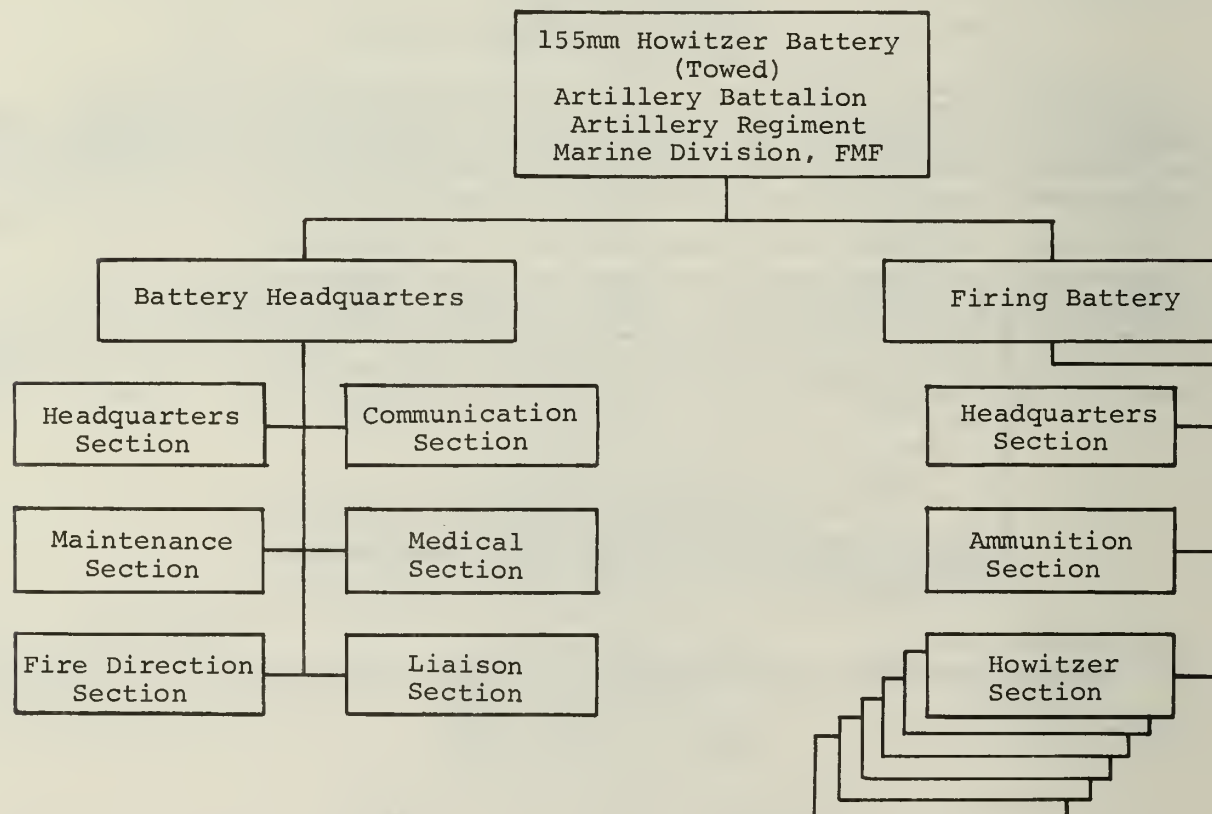


Figure 6.--155mm Howitzer Battery (Towed), Artillery Battalion.

by the battery headquarters. Firepower and mobility are provided by the howitzers and organic transportation. (See fig. 5.)

(3) 155mm Howitzer Battery (Towed).--The mission of the battery is to provide direct support, general support, and reinforcing fires to the units of a Marine division. The battery will normally operate as an integral firing element of the artillery battalion. The battery is organized into a battery headquarters and a firing battery. Command, control, communications, fire direction, and liaison are executed by the battery headquarters. Firepower and mobility are provided by the howitzers and organic transportation. (See fig. 6.) In order to provide full direct support capability, the battery requires forward observer augmentation.

#### 1203. FORCE ARTILLERY

In the event that the field artillery organic to the Marine division is deemed insufficient to provide adequate support to combat operations, additional artillery is available in force troops. Force artillery has the overall mission of providing long range, medium and heavy caliber, conventional, and special fires for the landing force. Force artillery units are task organized through the assignment of separate batteries for an operation and can provide, as required, a group headquarters for the command and control of those separate batteries. This organization is called the field artillery group (FAG). Refer to specific T/O's for a detailed discussion of the capabilities of each artillery unit.

a. Headquarters Battery, Field Artillery Group, FMF.--The mission of the headquarters battery is to exercise command and control over the attached units. The battery operates only with the field artillery group. Elements of the battery may be detached for support of other units. The battery is organized into functional areas comprised of a group headquarters, operations platoon, communications platoon, and battery headquarters. (See fig. 7.)

b. 8-Inch Howitzer Battery (SP), FMF.--The mission of this battery is to provide general support and reinforcing fires in the amphibious assault and subsequent operations ashore. The battery is organized into a battery headquarters and three howitzer platoons. Command, control, communications, fire direction, and liaison is executed by the battery headquarters. Firepower and mobility are provided by the howitzers and organic transportation. (See fig. 8.) The battery may be employed as a unit in support of a ground force. The howitzer platoons are capable of operations independent of the battery.

c. 175mm Gun Battery (SP), FMF.--The mission of this battery is to provide general support and reinforcing fires in the amphibious assault and subsequent operations ashore. The battery is organized into a battery headquarters and a firing battery. Command, control, communications, fire direction, and liaison are executed by the battery headquarters. Firepower and mobility are provided by the guns and organic transportation. (See fig. 9.) The battery is normally employed as a unit in support of a ground force.

d. 155mm Howitzer Battery (SP), FMF.--The mission of this battery is to provide general support and reinforcing fires in the amphibious assault and subsequent operations ashore. The battery is organized into a battery headquarters and a firing battery. Command, control, communications, fire

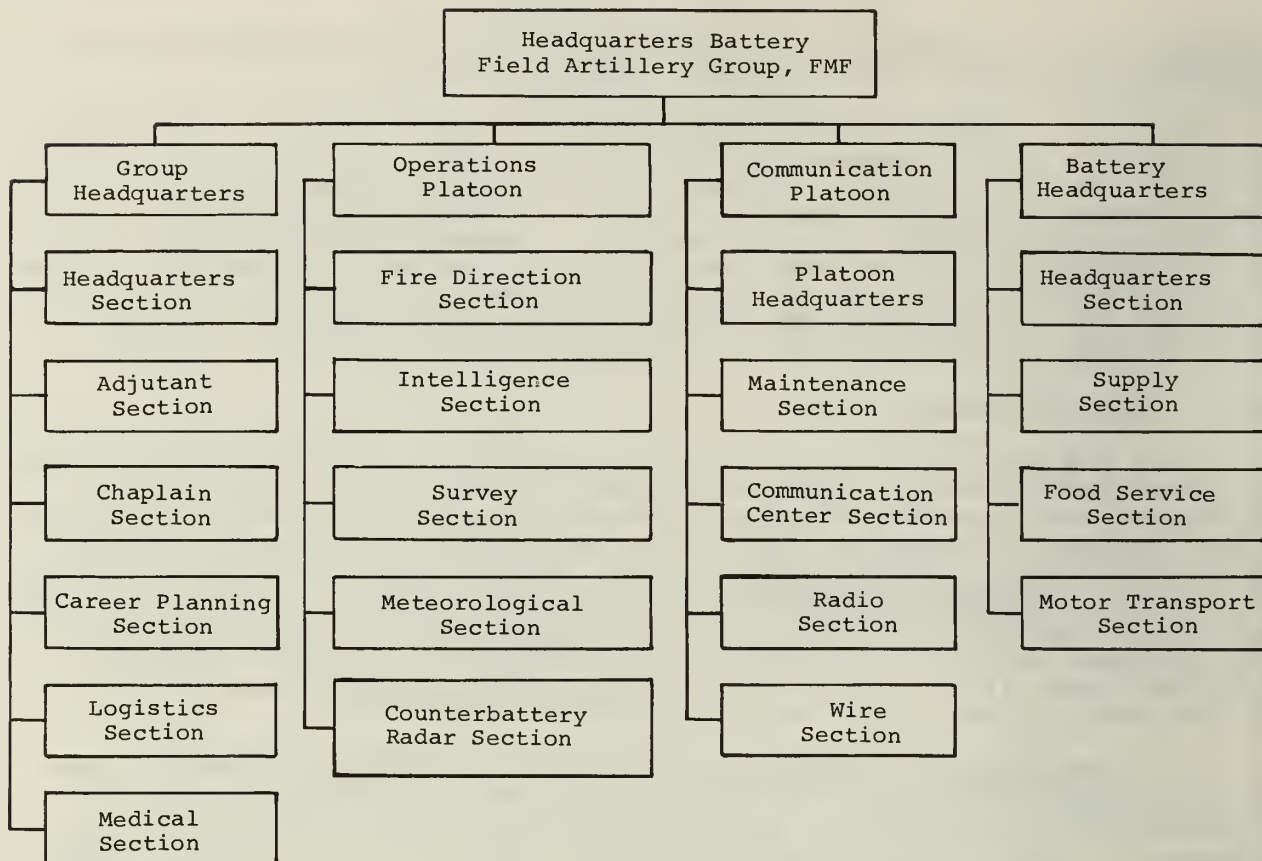


Figure 7.--Headquarters Battery, Field Artillery Group, FMF.

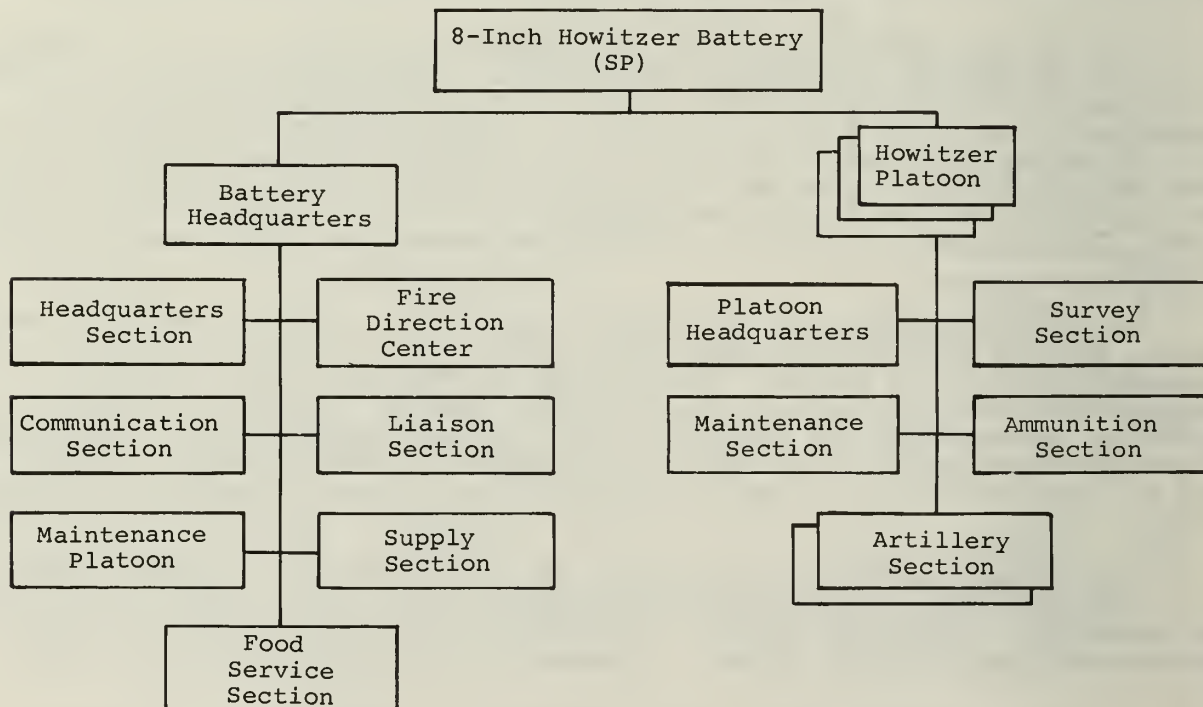


Figure 8.--8-Inch Howitzer Battery (SP), FMF.



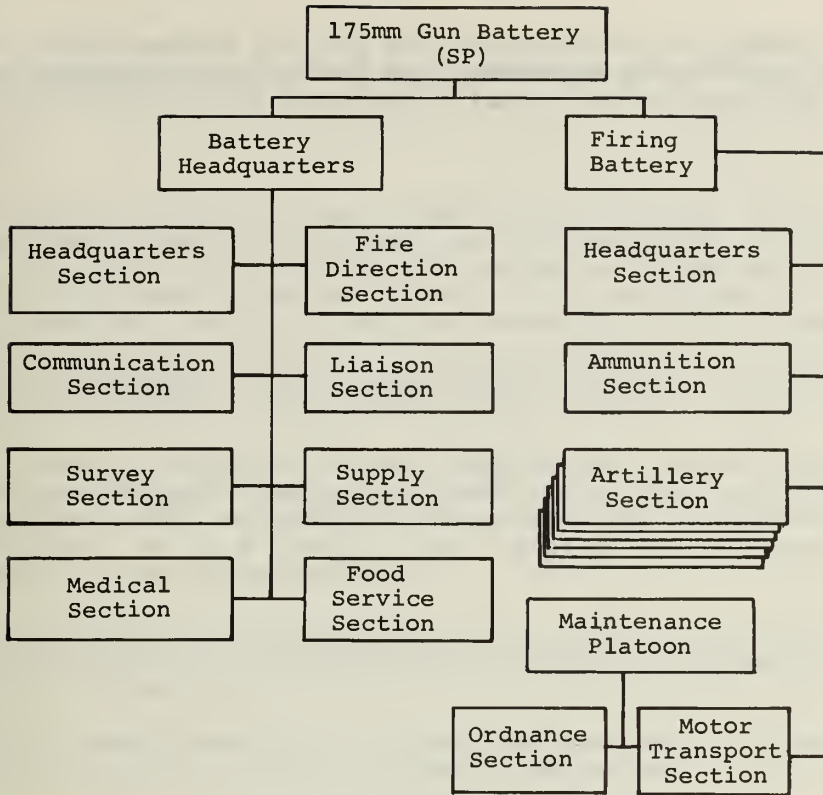


Figure 9.--175mm Gun Battery (SP), FMF.

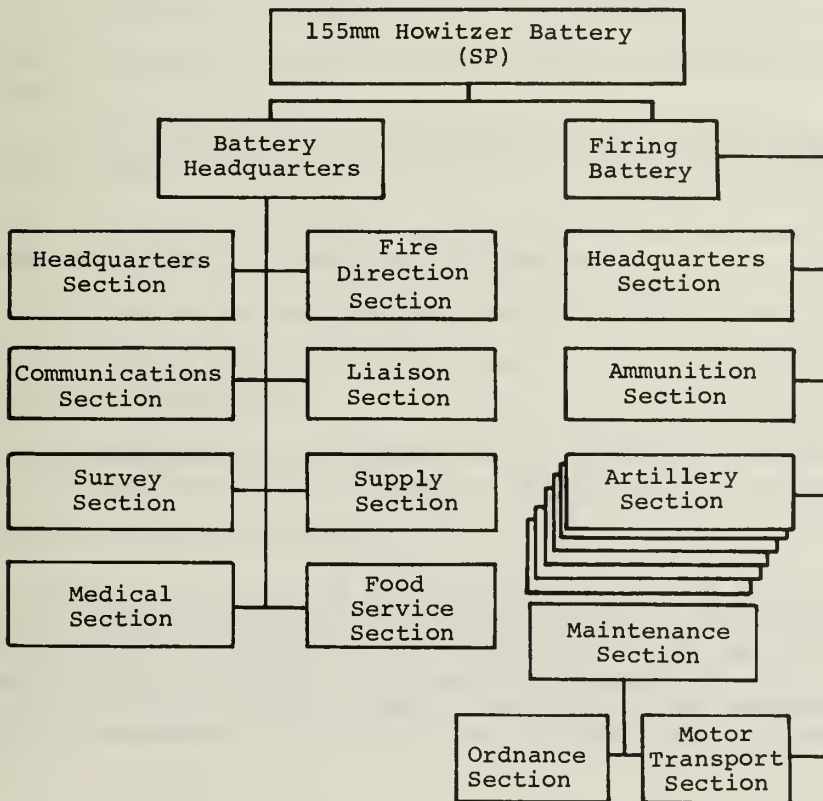


Figure 10.--155mm Howitzer Battery (SP), FMF.

direction, and liaison are executed by the battery headquarters. Firepower and mobility are provided by the howitzers and organic transportation. (See fig. 10.) The battery is normally employed as a unit in support of a ground force.

## Section III. ARTILLERY COMMANDER AND STAFF

## 1301. GENERAL

The responsibility for what a unit does or fails to do rests with the commander and that responsibility may not be delegated. The execution of the commander's plans and his policies will be accomplished by his subordinates. The degree of efficiency of an artillery unit's performance is a direct result of the leadership and professional knowledge of its commander.

## 1302. ARTILLERY OFFICER (FLEET MARINE FORCE, MARINE AMPHIBIOUS FORCE, MARINE AMPHIBIOUS BRIGADE, MARINE AMPHIBIOUS UNIT)

a. In the Fleet Marine Force headquarters, Marine amphibious force, Marine amphibious brigade, and Marine amphibious unit, an artillery officer of appropriate rank and seniority is designated as the force/brigade/unit artillery officer. He is a special staff officer who advises the commander on fire support and artillery matters.

b. The duties and responsibilities of the force/brigade/unit artillery officer are assigned by the commander and normally include, but are not limited to, the following:

- (1) Determines the artillery requirements and recommends the allocation of artillery units and available ammunition.
- (2) Advises the commander and staff on the employment of artillery.
- (3) Supervises the training of artillery units within the command.
- (4) Publishes information and intelligence of interest to the field artillery.
- (5) Exercises, in the commander's name, operational control of those units which have not been assigned or attached to subordinate units.
- (6) Provides for target analysis and damage assessment of nuclear fires employed on surface targets by own forces.
- (7) Studies and evaluates enemy field artillery capabilities.
- (8) Coordinates field artillery survey within the command with higher and adjacent commands.
- (9) Supervises the details of fire support coordination when assigned as the fire support coordinator (FSC) for the command.

## 1303. DIVISION ARTILLERY OFFICER

a. The artillery officer for a Marine division is the commanding officer of the artillery regiment of that division. He commands the artillery regiment and all units attached to that regiment. He advises the division commander and his staff on all field artillery matters. He is the fire support coordinator for the division. The duties and responsibilities of the field artillery commander of the division include, but are not limited to, the following:

(1) As the fire support coordinator for the division, is responsible for the functions stated in FMFM 7-1, Fire Support Coordination.

(2) Advises on matters pertaining to field artillery support and to deception operations by field artillery.

(3) Determines requirements for field artillery support and recommends the field artillery task organization and assignment of tactical missions.

(4) Provides information on the status of artillery ammunition on hand; recommends the artillery ammunition required supply rate (RSR); recommends the available supply rate (ASR) for the subordinate artillery units.

(5) Recommends the allocation and assignment of special ammunition for artillery missions, special ammunition load (SAL) for artillery units, and special ammunitions stockage for supply points and depots.

(6) Is responsible for and assists in the preparation of the fire support plan.

(7) Coordinates artillery target acquisition, meteorological operations, and survey within the division and with higher and adjacent commands.

(8) Studies and evaluates enemy field artillery capabilities.

(9) Supervises the training of artillery units within the division.

(10) Provides for target analysis and damage assessment of nuclear fires employed on surface targets.

(11) Insures that, when directed, and augmented by appropriate communication personnel and equipment, the artillery regimental command post can function as the alternate division command post.

#### 1304. ARTILLERY BATTALION COMMANDER

The artillery battalion commander is responsible for executing the fire support responsibilities inherent in the assigned tactical mission in addition to those responsibilities listed in paragraph 1303 as appropriate.

#### 1305. FIELD ARTILLERY GROUP COMMANDER

In addition to the applicable tasks listed in paragraph 1303, the field artillery group commander's responsibilities include, but are not limited to, the following command functions:

a. Controls the fires of the group.

b. Coordinates survey control.

c. Directs the training of the group headquarters and the batteries (units) attached to the group.



d. Provides logistical and administrative assistance to batteries (units) attached to the group.

e. Coordinates and disseminates meteorological information.

f. When he is the senior artillery officer of a Marine air ground task force (MAGTF), is prepared to perform all the duties listed in paragraphs 1302 and 1303 if so directed.

#### 1306. ARTILLERY BATTERY COMMANDER

When an artillery battery is not under the operational control of an artillery battalion or field artillery group, the responsibilities of the commander are comparable to those in paragraph 1304. When under the operational control of higher artillery headquarters, he performs these duties within the policies and procedures established by the higher commander. The battery commander is additionally responsible for the normal functions of a unit commander.

#### 1307. ARTILLERY STAFF

A staff is comprised of officers who assist the commander in the exercise of command. Since the control of artillery and the coordination of fire support are the principal duties of an artillery commander, his staff is organized accordingly. The duties and responsibilities of artillery staff officers conform to the principles and procedures described in FMFM 3-1, Command and Staff Action.

#### 1308. EXECUTIVE STAFF

The executive staff consists of the executive officer, S-1 (personnel), S-2 (intelligence), S-3 (operations and training), and S-4 (logistics). The executive officer supervises and coordinates the staff. Duties which pertain to artillery matters are:

a. S-1.--The advisor to the commander on matters pertaining to personnel and general administration. He has no duties which are peculiar to artillery.

b. S-2.--Primarily concerned with the direction of target intelligence and the coordination of target acquisition agencies. For additional information, see FMFM 2-1, Intelligence. Duties of the artillery S-2 include, but are not limited to:

(1) Coordinates observation and target acquisition agencies within the artillery unit.

(2) Combines all available information into a readily usable target list and file and recommends to the S-3 targets and a method of attack of targets based on his special knowledge of the enemy and situation.

(3) Receives, evaluates, and records shelling reports, counter-mortar and counterbattery reports, and other intelligence reports required by higher headquarters. He disseminates artillery intelligence so obtained.

(4) Operates a counterfire information center.

(5) Establishes battalion observation posts when directed.

(6) Briefs liaison officers and forward observers on the enemy situation and requirements for information.

c. S-3.--The S-3 of an artillery staff is also the gunnery officer. Duties include:

(1) Assists the commander in planning fires.

(2) Organizes and supervises the operation of the fire direction center.

(3) Prepares and forwards the fire capabilities report to higher headquarters.

(4) Distributes to subordinate units the necessary data for firing charts.

(5) Coordinates the activities of liaison officers.

(6) Keeps the artillery S-2 informed of all targets attacked or planned for attack. He advises the S-2 of changes in observation requirements.

(7) Keeps the unit firing record and ammunitions records, as appropriate.

(8) Coordinates with the S-4 in the preparation of ammunition resupply requirements.

(9) Coordinates and supervises survey activities.

(10) Recommends, as appropriate, the assignment of tactical missions for subordinate units.

(11) Prepares applicable portions of the artillery unit operation plan and the artillery fire support plan to the maneuver unit operation plan.

(12) Distributes the howitzers of the unit based upon relative shooting strength determined by calibration.

d. S-4.--Duties of the artillery S-4 include, but are not limited

(1) Plans and supervises ammunition supply in coordination with the S-3. Advises the S-3 of the availability of various lots of ammunition and ammunition status by types of fuzes, shells, and propellants.

(2) Recommends the locations for artillery ammunition dumps.

(3) Collects, reports, and disposes of salvage.

(4) Ensures that current and accurate embarkation data is maintained.

(5) Other duties as listed in FMFM 4-1, Logistics.

## 1309. SPECIAL STAFF

A special staff is comprised of officers whose activities pertain to a particular military specialty. Some of the special regimental staff officers and their duties as performed within artillery units are:

a. Communication Officer.--(See chap. 6.)

b. Survey Officer.--The survey officer's duties include, but are not limited to:

(1) The preparation and execution of the survey plan.

(2) Obtaining and carrying survey control to lower echelon artillery units. (See par. 5702.)

(3) Conduct of reconnaissance for routes, position areas, and observation as directed by the artillery commander.

(4) Supervision of survey training within the command.

(5) Close collaboration with the S-2 and S-3 in securing information on target location, observation, routes, and future position areas. He maintains and distributes records of survey control points (trig lists).

(6) Exchanging survey data and information with the survey officer of higher, lower, and adjacent units. This may include establishment of a survey information center (SIC).

c. Radar Officer.--The radar officer is in charge of the counter-mortar/counterbattery radar section. Tactical employment of radar is contained in paragraph 5804. The duties of the radar officer include, but are not limited to:

(1) Advise and assist the S-3 in organizing and supervising radar training programs.

(2) Establish liaison on radar matters with higher, adjacent, and lower headquarters.

(3) Advise the commander and staff on radar coverage.

(4) Maintain clutter and coverage diagrams.

(5) Advise the commander and staff on electronics countermeasures and antijamming techniques pertaining to radar. He recommends training measures on this subject to the S-3.

d. Meteorological Officer.--The meteorological officer disseminates meteorological information to using agencies and establishes liaison with other meteorological sections and the weather services of the other armed services. At the battalion level, this staff position is combined with that of the survey officer. Some of the responsibilities of the meteorological officer include but are not limited to:

(1) Obtains from the artillery commander the desired schedule of balloon flights and types of units in the area requiring meteorological support.



- (2) Positions the meteorological section.
- (3) Analyzes weather data.
- (4) Supervises computation and dissemination of meteorological information.
- (5) Obtains special weather data and forecasts.

e. Assistant Fire Support Coordinator.--Where assigned, the assistant FSC is the representative of the artillery commander in the fire support coordination center (FSCC). He is responsible for training the personnel assigned to the FSCC and maintaining the equipment provided to the FSCC. For details of fire support coordination, see FMFM 7-1, Fire Support Coordination.

f. Other Special Staff Officers.--Duties are generally as prescribed in FMFM 3-1, Command and Staff Action.

#### 1310. ARTILLERY LIAISON

Liaison between units is established to ensure mutual understanding and unity of purpose and action. This is usually accomplished by representative liaison where the agent of the artillery unit visits or lives and works with the supported unit. Liaison is established with the supported unit by the supporting unit and with the reinforced unit by the reinforcing unit. Liaison between lower and higher units is established as directed by the senior commander. Liaison is established between adjacent units on the initiative of adjacent commanders or by order of a senior common commander. The mission of liaison is accomplished by:

a. Command Liaison.--Through personal contact, the artillery commander effects liaison with the supported infantry or reinforced artillery commanders. Liaison between commanders is maintained continuously by a liaison officer furnished by the unit responsible. Command liaison is exercised at every opportunity.

b. Representative Liaison.--The liaison officer is the artillery commander's personal representative to the unit with which liaison is established. Frequent change of liaison officers is undesirable in view of the requirement to be thoroughly familiar with the supported or reinforced unit's policies, plans, situations, responsibilities, and missions. Nevertheless, where officers are required to be away from their parent units for prolonged periods, it may be desirable to rotate liaison officers and keep them informed of current information required in their duties.

c. Staff Liaison.--Liaison duties are not restricted to assigned liaison officers, but are performed by any staff officer or other assigned officer. Liaison between staff sections of one unit and similar sections of an associated unit is desirable for further cooperation and coordination. In effecting liaison, staff officers act only within the limits set by the policies of the commander.

d. Duties of Artillery Liaison Officers.--Assigned artillery liaison officers must plan and supervise the specialist training of their liaison section.

(1) Upon assignment, the artillery liaison officer should:

- (a) Obtain all available information concerning the situation of his own and the supported unit.
- (b) Understand the plan of fires.
- (c) Know the location of registration points and checkpoints.
- (d) Know the status of ammunition supply.
- (e) Know the amount of general support and reinforcing artillery available.
- (f) Know the plan of observation including the assignment of forward observers.
- (g) Know the plan for displacement of his own unit.
- (h) Secure necessary maps and aerial photos.
- (i) Arrange with the artillery communication officer for necessary communication equipment. He also obtains sound and visual signals, code words, brevity and operation codes, and collective call signs.

(2) Upon arrival at the command post of the supported unit, the liaison officer reports to the commander. He informs the commander of the location of the artillery, the artillery plan, and the amount of artillery fire support available. He establishes communications or inspects those already established. He visits forward observers in their assigned units or contacts them if a personal visit is impracticable. During his tour of duty, the artillery liaison officer:

- (a) Keeps the supported unit commander informed of the artillery situation and capabilities. The liaison officer acts as artillery advisor to the supported unit commander.
- (b) Keeps his battalion commander informed of the location and plans of the supported unit and of the supported unit's scheme of maneuver.
- (c) Transmits request for fires as appropriate.
- (d) Assures a prompt exchange of intelligence information.
- (e) Visits his own command post when the situation permits, reporting on the situation and effectiveness of the artillery support.

(3) The liaison officers of a division artillery battalion with supported infantry units are required to perform the following additional duties:

- (a) Coordinate the work of the forward observers in the zone of action of the supported unit.
- (b) Based on the supported unit commander's concept of fire support and scheme of maneuver, and in close coordination with his staff, plan supporting artillery fires. Coordinate with the air and naval gunfire

planners. Perform the duties of fire support coordinator, if so designated. Transmit the approved fire plan to the artillery unit.

(c) When the unit normally supported is in reserve, the artillery liaison officers maintain contact with the supported commander.

(d) Act as an observer when necessary. Report the location and observation capability of the supported infantry observation post if one is established.

(e) Keep the artillery battalion commander informed of all patrols, their size, time of starting, routes, mission, return routes, checkpoints, and expected time of return.



## Section IV. STAFF PLANNING

## 1401. GENERAL

Artillery planning is conducted as required by the artillery commander or higher headquarters.

a. Landing Force Artillery Officer.--The landing force artillery officer is responsible for planning and recommending organization and employment of artillery in the landing force. Artillery commanders and their staffs prepare the artillery estimate of supportability and the estimate of artillery requirements for the commander. (See pars. 1406 and 1407.) After the commander landing force's decision is made, the artillery officer prepares the artillery fire plan for the force operation plan.

b. Artillery Unit Commander.--With the guidance provided in the artillery fire plan of the force operation plan and/or the operation plan of the parent artillery unit, the artillery unit commander may issue his own operation plan.

## 1402. ARTILLERY STAFF ESTIMATES

Staff estimates are within the framework of the commander's estimate and decision. Staff estimates present means of review and recommendation regarding organization for combat, logistic support, intelligence, and tactical employment of the artillery. These estimates are produced by or under the cognizance of the artillery commander and the executive staff. (See FMFM 3-1, Command and Staff Action.)

a. Basis of Artillery Staff Estimates.--Requirements considered ensure that:

(1) Adequate transportation means are available to move the required artillery and ammunition to the objective area and to sustain its replenishment.

(2) Sufficient artillery is available to place the required massed fires on important targets and to attack all enemy installations that may affect operations.

(3) The amount and types of artillery required depend primarily upon the capabilities of the enemy, terrain, and plan of the commander.

(4) Where units make supporting attacks, allocation of limited amounts of artillery is provided in order to mass the bulk of fires in areas where decisive offensive action is contemplated.

b. Landing Force Staff Estimates.--The artillery estimate of supportability (see par. 1406) and the estimate of artillery requirements (see par. 1407) are prepared by the landing force artillery officer within the framework of the commander landing force's estimate and decision. Amphibious planning is covered in paragraph 1405.

## 1403. ARTILLERY FIRE SUPPORT PLAN

The artillery fire support plan is part of the operation plan of the supported unit. It contains the necessary information and instructions pertaining to the employment of artillery assigned. (See app. D.)

a. Applicability.--The artillery fire support plan is applicable to all artillery under the control of the landing force. Missions are usually assigned only to those artillery units retained under direct control of the artillery headquarters of the command issuing the plan. Nevertheless, specific instructions may be included for artillery units attached to subordinate elements to ensure continuity and overall effectiveness of artillery support. For example, the artillery fire support plan may prescribe that an artillery battalion be prepared to reinforce the fires of another artillery unit.

b. Form and Content.--The appendix is prepared in the standard five-paragraph form prescribed for operation plans. Reference is made to standing operating procedures (SOP's) where possible. (See FMFM 3-1, Command and Staff Action.)

(1) Paragraph 1 contains such information of the situation as may be essential for amplifying the artillery situation. Subparagraph 1c shows attachments and detachments of artillery units.

(2) Paragraph 2 contains a concise statement of the task to be accomplished by the artillery. It is written in the form of a mission.

(3) Paragraph 3 prescribes how the artillery will support the scheme of maneuver. Subparagraph 3a describes how the commander intends to employ his artillery to accomplish the mission. Beginning with subparagraph 3b, additional subparagraphs in the number required set forth the organization for combat, tactical missions, landing instructions, position areas, zones of fire, and other pertinent instructions for each element of the artillery task organization. The last lettered subparagraph is titled "Coordinating Instructions" and contains information on artillery matters applicable to two or more units. Such matters include date and time of landing, gunnery instructions, survey, meteorology, air observation, position areas, fire capabilities, counterbattery, restrictions on fire, and antimechanized fires. Reference is normally made to SOP.

(4) Paragraph 4 may contain the plan for ammunition resupply and the available supply rate. Reference is normally made to the administrative and logistics annexes and to administrative and logistic SOP's.

(5) Paragraph 5 references the communications-electronics annex of the operation plan as well as the communication operation instruction (COI) and communication SOP. The location of command posts, both ashore and afloat, is also shown in this paragraph.

c. Supporting Papers.--Information that is too voluminous to put into the body of the artillery fire support plan may be placed in supporting papers to the plan. The task organization, concept, position areas overlay, survey plan, list of registration points, assignment of target numbers and other lengthy documents may be appended. Whenever possible, reference is made to existing SOP's.

## 1404. OPERATION ORDER/PLAN

The artillery unit commander may issue an operation order/plan based upon the guidance of higher headquarters and his own estimate of the situation. His mission and certain instructions relative to artillery matters are contained in the artillery fire support plans/operation plans of higher echelons. His order/plan may be written or oral, depending upon the situation. Reference to SOP's may reduce the bulk of the order/plan. However, the order is as detailed as necessary to accomplish the mission without hindering the flexibility of the affected artillery. (See app. E.)

## 1405. AMPHIBIOUS PLANNING

Planning the amphibious operation and the employment of artillery to support the landing is similar to planning conventional operations and is characterized by extremely detailed staff work.

a. Initiation of Artillery Planning.--Upon receipt of the initiating directive from the commander landing force, artillery units at all echelons establish the necessary liaison to facilitate planning. Command, staff, and representative liaison is effected. The objective is to provide the artillery organization and means that can best support the operations envisioned by the commander's concept. This planning is coordinated at every level and accomplished in sufficient detail to allow subordinate artillery echelons to conduct concurrent planning. When planning discloses the need for special training, the landing force artillery officer includes such requirements in his training directives.

b. Artillery Planning Tasks.--Early in the planning phase, the landing force artillery officer prepares an estimate to determine the capability of the artillery to support each of the proposed courses of action. Concurrently, the artillery officer evaluates overall artillery requirements for the operation. After the commander landing force has issued his decision and concept of operations, the artillery officer prepares his final estimate of artillery requirements. It becomes the basis for all subsequent artillery planning. After the scheme of maneuver and plan of supporting fires are determined, the landing force artillery officer prepares the plan for the employment of field artillery; this becomes the artillery fire support plan to the landing force operation plan or order. Subordinate commanders and their staffs concurrently develop estimates and subsequent plans which are based on their own units' capabilities and requirements.

## 1406. ESTIMATE OF SUPPORTABILITY

An estimate of supportability is normally prepared by the landing force artillery officer. This estimate is part of the framework of the commander landing force's estimate and decision. The estimate analyzes the comparative capabilities of the artillery to support each contemplated course of action. (See app. A.)

a. Influencing Factors.--In preparing the estimate, the landing force artillery officer lists all information and necessary assumptions that pertain to artillery. He determines the advantages and disadvantages of each course of action by considering the following factors:

- (1) Landing force mission.



- (2) Enemy situation.
- (3) Required artillery support.
- (4) Hydrography.
- (5) Topography.
- (6) Weather.
- (7) Observation requirements.
- (8) Communication requirements.

b. Preparation.--Written estimates of supportability are prepared at the highest command echelons and at lower echelons for separate operations and when requested by the supported unit commander. The artillery viewpoint is reflected in the analysis and comparison of courses of action, and in the conclusions and recommendations made by the artillery officer in this estimate. The body of the estimate contains five paragraphs titled: mission, situation and considerations, artillery analysis, evaluation, and conclusions:

(1) Paragraph 1, MISSION

- (a) Artillery concept of the mission.
- (b) Previous decisions (if any).
- (c) Purpose of the estimate (when required).

(2) Paragraph 2, SITUATION AND CONSIDERATIONS

- (a) Characteristics of the area of operations.
- (b) Discussion of the enemy capabilities and most probable cause of action.
- (c) Discussion of friendly forces and courses of action.
- (d) Assumptions.

(3) Paragraph 3, ARTILLERY ANALYSIS.--Contains a discussion, from the artillery viewpoint, of friendly courses of action. This is a brief discussion concerned with the factors affecting the employment of artillery with the landing force.

(4) Paragraph 4, EVALUATION.--States the advantages and disadvantages in the employment of artillery to support each course of action.

(5) Paragraph 5, CONCLUSIONS.--Should include the following:

- (a) A statement as to which course of action under consideration can best be supported from an artillery point of view.
- (b) A statement of the salient disadvantages which render the other courses of action less desirable. The courses of action are normally listed in order of decreasing degree of supportability.

(c) A statement of significant problems to be solved and limitations to be taken into account.

(d) A statement of measures required to solve the problems involved.

#### 1407. ESTIMATE OF ARTILLERY REQUIREMENTS

An estimate of artillery requirements is normally made by the landing force artillery officer. This estimate is completed after the commander landing force has announced his decision to ensure that adequate artillery support is provided for the operation. (See app. B.)

a. Determination of Requirements.--The estimate determines the following:

- (1) Amount of artillery required by type and caliber.
- (2) Amount of ammunition and fuzes required by type.
- (3) Amount of shipping, landing craft, and amphibious vehicles required by type.
- (4) Amount of special equipment required by type.

b. Influencing Factors.--In arriving at the estimate of artillery requirements, the landing force artillery officer analyzes each of the factors listed below in terms of the requirements listed above.

- (1) Mission of the landing force.
- (2) Scheme of maneuver.
- (3) Enemy situation.
- (4) Characteristics of the area of operations.
- (5) Estimated duration of the operation.
- (6) Employment of other fire support means.
- (7) Employment of nuclear or chemical weapons.

c. Preparation.--Written estimates of artillery requirements are prepared in a form similar to the estimate of supportability.

(1) Paragraph 1, MISSION OF THE LANDING FORCE

(2) Paragraph 2, SCHEME OF MANEUVER.--The scheme of maneuver of each supported unit must be studied to determine the artillery needed for adequate support. If the landings are to be made over widely separated beaches or landing zones, artillery requirements may increase, particularly for weapons or ammunition with longer ranges.

(3) Paragraph 3, ENEMY SITUATION.--The enemy situation must be considered with respect to the following:

(a) Nonartillery Forces.--Enemy forces other than artillery are considered in respect to numbers and types of units. Their disposition, armament, mobility, number and types of equipment, and combat efficiency must be analyzed.

(b) Artillery.--The amount, type, caliber, and range capability will influence the requirements for weapons, ammunition, and special equipment.

(4) Paragraph 4, CHARACTERISTICS OF THE AREA OF OPERATIONS.--The following must be considered:

(a) Hydrography.

(b) Topography.

(c) Weather/average visibility.

(5) Paragraph 5, ESTIMATED DURATION OF THE OPERATION.--The estimated duration of the operation against the enemy will influence the amount of ammunition required.

(6) Paragraph 6, OTHER FIRE SUPPORT MEANS.--Employment of other fire support means are considered with respect to:

(a) Naval Gunfire Support.--The amount, type, and duration of naval gunfire support available will influence the amount of artillery required, particularly in the heavy calibers. (See FMFM 7-2, Naval Gunfire Support.)

(b) Close Air Support.--The amount and type available must be considered in determining overall requirements.

(7) Paragraph 7, EMPLOYMENT OF NUCLEAR OR CHEMICAL WEAPONS.--The availability of nuclear or chemical weapons and their potential employment will influence all requirements depending on the commander's concept of operations.

(8) Paragraph 8, CONCLUSIONS

#### 1408. FORMULATION OF THE ARTILLERY FIRE SUPPORT PLAN

The artillery fire support plan is developed after the commander landing force has reached his decision and issued his order or the necessary guidance for the artillery planning to continue. The artillery fire support plan is based on the commander landing force's concept of the operation, the final allocation of artillery units, and the tactical principles of artillery employment.

a. Development of the Plan.--All of the factors discussed in subparagraph 1407b are reevaluated in respect to artillery units allocated to the landing force. In addition, the requirements must be evaluated in light of the following factors which influence the capability of artillery to provide adequate fire support:

(1) Organization for combat.



- (2) Available shipping, air transport, and helicopter lift.
- (3) Organization for embarkation.
- (4) Target intelligence.
- (5) Counterfire responsibilities.
- (6) Landing beaches and time of landing.
- (7) Position areas.
- (8) Zones of fire.
- (9) Observation.
- (10) Reconnaissance.
- (11) Communications.
- (12) Logistics.

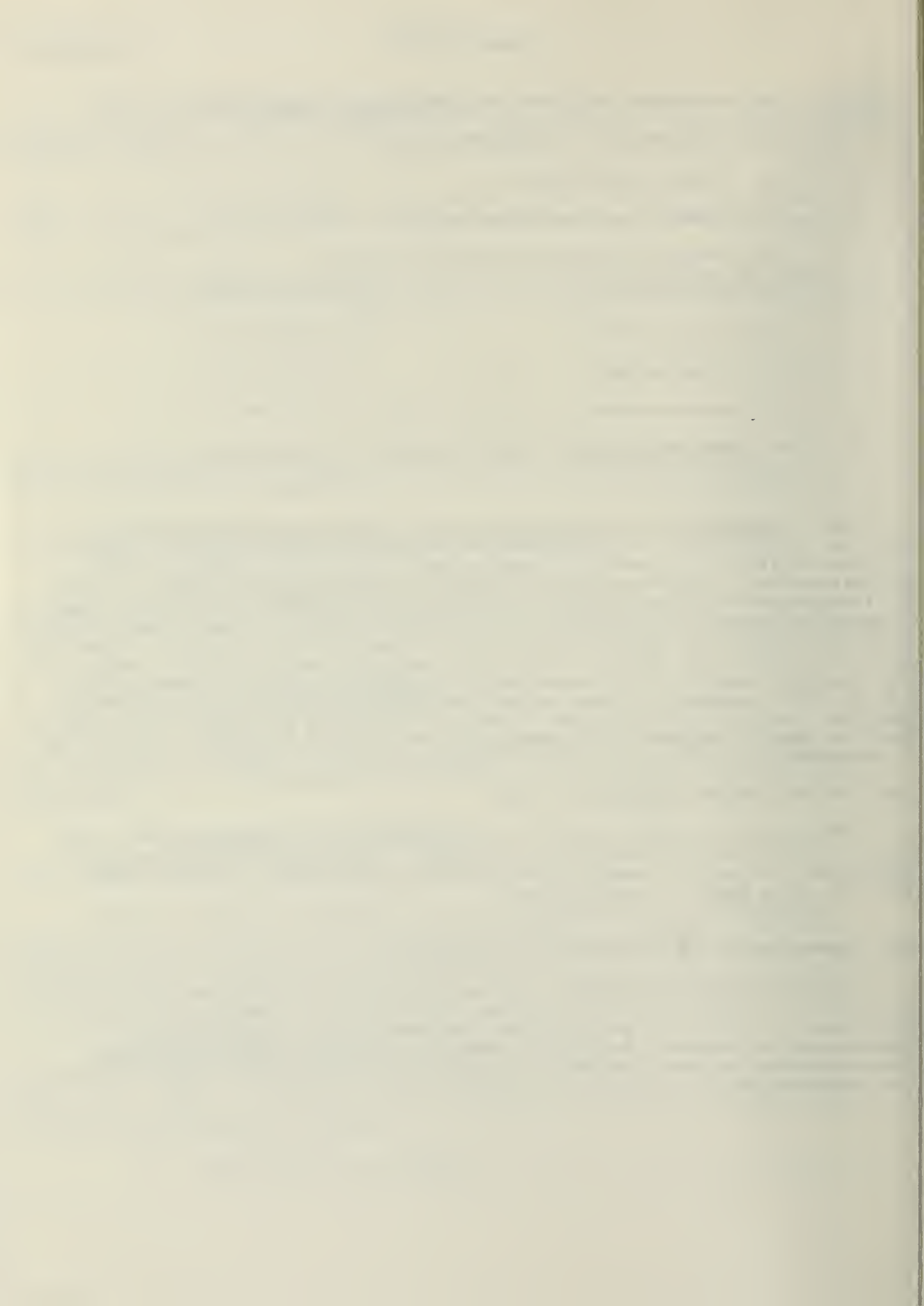
b. Preparation of the Plan.--The fire support plan for artillery with the landing force, or principal subordinate elements thereof (division or force artillery), is usually prepared as a part of the landing force operation plan. (See par. 1403.) Artillery battalions, regiments, or FAG's can issue separate operation plans based on the artillery fire support plan appendix, as appropriate. When a unit operation plan is issued, the content of the artillery fire support plan in the infantry unit's operation order consists primarily of the plan of supporting fires and details to assist the infantry commander. To avoid unnecessary repetition, references may be made to other annexes or plans for certain aspects of artillery employment. Detailed instructions concerning gunnery are normally contained in unit SOP's. Specific details concerning the operation, or varying from SOP, are included in the plan.

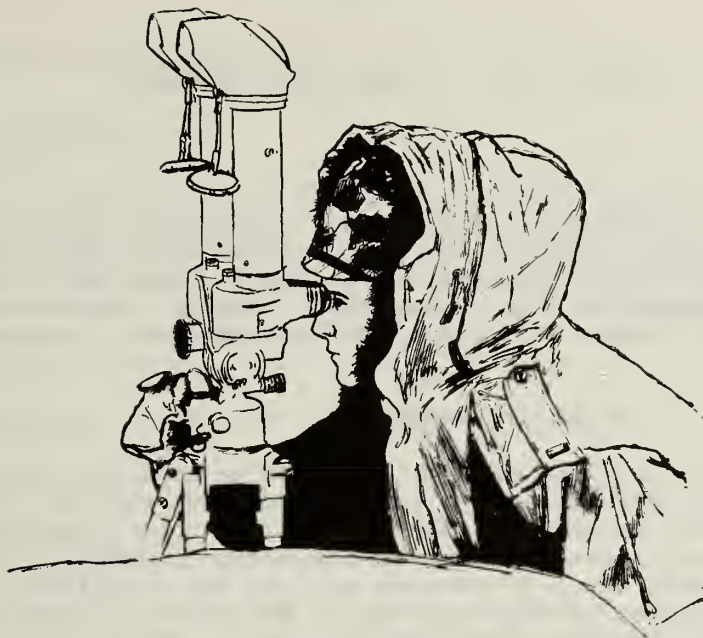
#### 1409. FIRE SUPPORT COORDINATION PLAN

This plan is usually prepared by the artillery representative in the FSCC. It will contain such items as initial control/coordination measures, designation system for restrictive fire plans, and safety measures. (See FMFM 7-1, Fire Support Coordination.)

#### 1410. EMBARKATION AND ADMINISTRATION PLANNING

The embarkation officer of the artillery unit establishes the necessary liaison, prepares loading documents, and stages troops and vehicles in accordance with guidance and shipping provided by higher headquarters. Embarkation is discussed further in chapter 7. The S-1 and S-4 prepare the administrative plan and the logistics plan to complement the artillery fire support plan.





## CHAPTER 2

### INTELLIGENCE

#### Section I. GENERAL

##### 2101. DEFINITIONS

The combat intelligence function of the landing force results in two basic intelligence products: decision-oriented intelligence and target intelligence. The commander landing force employs decision-oriented intelligence in the design and execution of maneuver; he employs target intelligence in the application of firepower. Both types of intelligence emerge from the same broad collection effort of the combat intelligence function, but target intelligence poses more exacting requirements for accuracy and timeliness. In this chapter, target intelligence, target acquisition, counterfire activities, and intelligence operations are discussed.

a. Field artillery target intelligence is the knowledge acquired through the collection, processing, and dissemination of all information pertaining to potential or actual targets.

b. Target acquisition is that part of the intelligence activities which involves accurate and timely detection, identification, and location of ground targets to permit the effective employment of supporting weapons.

## Section II. TARGET INTELLIGENCE

## 2201. GENERAL

A thorough development of target intelligence is necessary for the proper employment of artillery units, the timely and effective delivery of fire, and the coordination movement and fire support with the supported unit and other supporting arms. The efficiency with which the artillery fulfills its mission depends largely on adequate and timely target intelligence.

## 2202. COLLECTION OF TARGET INFORMATION

a. General.--All collection agencies available to the commander must be impressed with the requirement to provide complete and accurate target information in order to satisfy the needs of users. Timeliness in acquiring targets is absolutely essential since the enemy will try to avoid presenting lucrative targets and those presented will be as transitory as possible. Visibility diagrams should be required of all forward observers and radar positions. These diagrams will establish which areas are not under line-of-sight for ground observation and will indicate where sensors and aerial observers may be required.

b. Collection Means Available.--Several means are available to aid the field artillery commander in the collection of target information. Reports from radar, sound ranging, flash ranging, shell reports, unattended ground sensors, signal intelligence resources, and general surveillance must be included in a collection plan. The landing force G-2 (or S-2), in discharging his responsibility for development of the collection plan, makes full use of field artillery agencies in collecting combat intelligence. The discharge of this responsibility is enhanced by the artillery's extensive communication system, target acquisition equipment, and ability to coordinate numerous observers; and by the field artillery's system of providing liaison personnel to each maneuver battalion, regiment, and to the division headquarters.

## 2203. PROCESSING TARGET INFORMATION

a. Processing is the means by which target information is transformed into target intelligence. Target intelligence must be sufficiently detailed to permit:

(1) An analysis of the target to determine the most effective weapon for use against the target.

(2) An evaluation of the importance of the target in relation to the mission of the command.

(3) An evaluation of the effect that the attack of the target will have on future acquisition of intelligence.

(4) An evaluation of the effect of attacking the target now versus the effect of a later attack of the target.



b. Recording, evaluation, and interpretation are the basic elements of processing.

#### 2204. RECORDING INFORMATION

Two types of records are maintained in the artillery intelligence section. These are the general target records and the counter mortar/counterbattery records. Recording consists of reducing the information to graphic or written form and systematically sorting it into groups of like items for convenience of study and comparison. Several aids to recording are used by the artillery S-2 to assist him in recording target information and intelligence. Among these are:

a. S-2 Journal.--(See FMFM 2-1, Intelligence.)

b. S-2 Worksheet.--(See FMFM 2-1, Intelligence.)

c. S-2 Situation Map.--At the artillery battalion level, the situation map may be maintained jointly by the S-2 and S-3.

d. Target Overlays.--Target overlays are used with the situation map and contain the plotted position of all known and/or suspect enemy activity.

e. Target File.--The target file is a card file. The S-2 uses it in evaluating reports concerning any activity at a specific location.

f. Counterfire Records.--(See par. 2507.)

#### 2205. EVALUATING INFORMATION

The evaluation is the critical examination of information to determine its value in terms of pertinence, reliability, and accuracy. Some of the information collected may be unusable because it is not pertinent to the operation, the reporting source is unreliable, or in light of other information, there is doubt as to accuracy. (See FMFM 2-1, Intelligence.)

#### 2206. INTERPRETATION OF INFORMATION

Interpretation can disclose target characteristics which will dictate the fire support means necessary to achieve the desired effect. Interpretation is especially significant in the selection of nuclear targets.

#### 2207. DISSEMINATION OF INTELLIGENCE

a. Dissemination is the timely distribution of intelligence, in suitable form and detail, to all persons and units who may have a requirement for the intelligence. Since forwarding all intelligence as it is processed may overload the communication system, the artillery S-2 decides what intelligence requires immediate distribution. The nature of the intelligence, such as counterfire intelligence, will indicate the speed of dissemination.

b. Field artillery intelligence is used to determine the enemy's capabilities and probable courses of action, to assist the artillery commander in the destruction or neutralization of confirmed targets, and to advise the commander landing force on fire support in the attack of suspect targets. Field artillery intelligence is used extensively in fire planning and is discussed in chapter 3.

## SECTION III. TARGET ACQUISITION

## 2301. GENERAL

Field artillery target acquisition agencies are part of the intelligence gathering agencies of the force as a whole and, as such, are a major component of the combat intelligence system at all echelons.

## 2302. FUNCTION AND OBJECTIVE

a. Target acquisition results from applying information collected from all sources and agencies for a special purpose. The primary function of field artillery target acquisition agencies is to gather and process target information of importance to artillery operations.

b. The principal objective of the target acquisition effort is to achieve predicted fire capabilities for the first round effectiveness. The effectiveness of artillery fires will depend largely on the accuracy, completeness, and timeliness of target acquisition.

## 2303. TYPES

a. There are two types of target acquisition: direct and indirect. Direct target acquisition refers to target acquisition data obtained by one target acquisition means. Indirect target acquisition is the development of target data from an evaluation of target information supplied by two or more means.

b. Both types of target acquisition are used to detect, identify, and locate targets. Detection consists of ascertaining the existence or presence of a target. Identification consists of determining the nature, composition, and size of the target. Location consists of determining the three-dimensional coordinates of the target with respect to known points or weapons; i.e., with respect to a common grid. Location requires greater accuracy for target acquisition purposes than for general intelligence purposes.

## 2304. SYSTEMS

A target acquisition system consists of the equipment and personnel necessary to perform target acquisition. The principal agencies and sources available to the artillery S-2 are:

a. Forward Observers.--Artillery forward observers are assigned to each infantry company. The team organization provides for continuous surveillance over the zone of the supported unit. (See chap. 5.)

b. Countermortar/Counterbattery Radar.--The countermortar/counterbattery radar sections organic to the artillery have an effective depth of observation of approximately 10 kilometers.

c. Artillery Air Observers.--Artillery air observers provide the artillery S-2 with visual surveillance over the entire objective area. (See chap. 5.)



d. Shell Report Teams.--(See par. 2403.)

e. Flash Ranging.--(See par. 5805.)

f. Intelligence Sources External to the Artillery Unit.--In addition to artillery target acquisition agencies, the artillery S-2 must exploit the combat intelligence collecting agencies and other sources within the landing force. Some of these are:

(1) Ground Observers.--Ground observers such as mortar platoon observers, reconnaissance elements, infantry unit observation posts, outposts, patrols, and frontline troops.

(2) Tactical Air Observers.--When air observers external to the artillery unit are directly engaged in artillery target acquisition, their effort is normally coordinated by the chief artillery air observer.

(3) Prisoners of War.--The collection of combat intelligence from prisoners of war should include interrogation on artillery information.

(4) Ground Surveillance Sensors.--Sensors organic to the infantry can be exploited for target acquisition. The artillery officer should ascertain from the supported infantry S-2 the location and sectors of surveillance of ground sensors. He should coordinate them with his plan of observation. Forward observers are informed when sensors are located in the proximity of their observation posts so they can supplement their capability to locate targets.

(5) Civilians and Refugees.--The interrogation of civilians and refugees can often provide valuable information.

(6) Captured Material.--Captured material can provide information for determining hostile artillery means and the structure of the enemy forces.

(7) Overrun Positions.--Enemy artillery documents, publications, maps, overlays, and orders are carefully reviewed for potential intelligence by the artillery S-2.

(8) Airborne Sensors.--Requests for specific coverage are made to the landing force intelligence section. Imagery coverage requested by the infantry, during interpretation, often reveals artillery intelligence. Proper coordination of infantry and artillery intelligence efforts provides timely exchange of information. The artillery liaison officer must be alert to the existence of airborne sensor coverage and should relate it to artillery intelligence requirements.

(9) Staff Visits.--Close staff liaison should be maintained between the artillery S-2, target information officer (TIO), and the infantry S-2/G-2. In the timely exchange of information, the overall intelligence mission is accomplished and the entire landing force benefits.

(10) Reconnaissance Units.--The artillery S-2 should exploit these sources through the appropriate G-2 by providing a request which describes information specifically required by the artillery and by carefully reviewing reconnaissance reports submitted by these activities.

## 2305. CONSIDERATIONS

a. Environmental conditions impose a wide and varying range of limitations on each target acquisition means employed. In order to insure continuity of the target acquisition effort, complementary target acquisition means must be used to insure the effectiveness of the means in day and night operations under all environmental conditions.

b. The techniques involved in transmitting and processing target data determine to a great extent the speed with which targets can be engaged. Targets capable of displacing rapidly and/or imposing an immediate serious threat to the landing force must be engaged as soon as possible after they have been acquired. Therefore, all possible measures must be taken to reduce to a minimum the time required to transmit and process target data.

c. Operational characteristics also impose limitations on each of the means employed. Normally, these limitations do not reduce the speed with which targets can be engaged.

## Section IV. TARGET AND COUNTERFIRE ACQUISITION TECHNIQUES

## 2401. GENERAL

The artillery S-2 interest is centered in the collection of target and counterfire information to be processed into usable artillery intelligence. Accumulation of targets is effected, in main, through observation means available to the artillery.

a. General Target Information.--Deals only with those targets that may interfere with the tactical operations, but not normally with the fire support means.

b. Counterfire Information.--Refers to counterflak, countermortar, and counterbattery information. Counterfire targets are treated as a specialized grouping in view of their inherent capability to interfere with the fire support agencies and tactical operations.

## 2402. COORDINATION OF OBSERVATION

The artillery S-2's at all levels will effect coordination of observation by utilizing a plan of observation for those means available (i.e., forward observer (FO) teams, air observers, etc.) to their echelon. To develop this plan, the zone of observation is studied to determine the number of observation posts needed and their locations. It may be necessary to provide supported infantry units with more than one forward observation team for each company in difficult terrain such as mountains and jungles. During darkness and in fog and precipitation, greater reliance is placed upon electronic target acquisition means.

a. Plan of Observation.--This plan is developed simultaneously at each echelon and coordinated by each artillery headquarters with final coordination at the landing force level. Coordination of observation is a continuous process. Operations of target acquisition agencies are controlled by the artillery commander. This control is exercised through the artillery S-2 to ensure:

- (1) Complete coverage of the zone of action or defensive sector.
- (2) Assignment of definite areas of responsibility to each artillery observation post.
- (3) Constant surveillance of likely avenues of approach of enemy forces.
- (4) Distribution of observation posts to avoid unnecessary duplication, to provide continuity during enemy advances into the positions, to reduce the amount of defiladed areas to the minimum, and to provide a large angle of intersection in order to establish bilateral observation (target area bases) for target location and adjustment of fire using combined observation.
- (5) Maximum coordination and appropriate employment of available target acquisition agencies.



## (6) Continuous operation.

b. Area Coverage.--To accomplish area coverage and to intensify the search for information and targets, primary zones of observation are assigned to each observer. The primary zone of observation includes the responsibility for critical areas such as probable avenues of approach, boundaries between units, and areas in adjacent zones screened from their assigned observers. Secondary zones of observation may be assigned for other areas within the field of view of the observer.

c. Visibility Charts.--All ground observation agencies prepare visibility overlays. These overlays are consolidated by the artillery S-2 at each echelon and a visibility chart prepared and forwarded to the next higher headquarters to determine whether or not adequate coverage is provided for the area of interest. These charts portray the capability of visual and electronic observation means. They will expose dead spaces within the observation plan and indicate the necessity for redistribution or additional observation; they should be checked by the use of terrain profiles.

d. Deep Observation.--At force level, particular attention is directed toward adequate coverage at the critical junction of frontlines and at division boundaries, and toward the search for targets in depth.

## 2403. SHELL REPORT TEAMS

Shell report teams are among the best sources of counterfire information. These teams are designated by the infantry and artillery commanders to make crater analysis. All forward observer teams should be designated as shell report teams. In addition, all artillerymen should be trained in crater analysis and shell fragment identification. Shell reports are sent immediately, even during the actual shelling, so that the artillery S-2 can request a fire mission, institute a search, or conduct surveillance of the indicated origin of shelling. Two men with a compass or aiming circle and several stakes are an effective shell report team, provided they are properly trained.

## 2404. TARGET AND COUNTERFIRE REPORTS

Target and counterfire information reports originate from many sources including flash and radar rangings, forward observers, artillery observers, infantry sources, shell report teams, and higher, lower, and adjacent headquarters. This information is passed to the artillery fire direction center (FDC) by the forward observer's fire mission, observer's intelligence report, or the artillery counterfire information form (ACIF). The intelligence report and ACIF are discussed below:

a. Sequence of Information.--The observer must report exactly what he sees and not what he may infer or deduce from his observation. Negative reports are submitted when the S-2 requires observers to report on a time schedule. When the observer's report relates to enemy activity, it should follow the sequence outlined as follows:

- (1) Identification of the observer, agency, or headquarters.
- (2) Nature of the activity.
- (3) Location of the activity.

- (4) Number of individuals, vehicles, guns, or units by type.
- (5) Direction of movement and speed.
- (6) Whether or not fire is desired on the activity.

b. Counterfire Information Form.--Shell report teams, radar, and flash ranging, among others, report on the ACIF. These reports are submitted when hostile fire is observed in friendly areas. Shelling reports (shelreps), mortar reports (mortreps), and bombing reports (bomreps) provide information that will assist in locating the hostile battery or deducing hostile air capabilities. Reports are as complete as speed in transmission will permit. No report is delayed or neglected for lack of complete information. Fragmentary reports are of value in supplementing or confirming information already on hand. Items to be included in the reports are transmitted in the following sequence (see FM 6-121, Field Artillery Target Acquisition):

- (1) Item A.--Identifies the source of the report (e.g., OP-1). The current call sign or code name of the reporting agency is used.
- (2) Item B.--Gives the position of the observer. A map reference is preferred; however, such a reference should be encoded when different from item F. The location of the observer is essential for plotting an azimuth reported in item C.
- (3) Item C.--Gives the magnetic or grid azimuth of the flash, flight path (missiles), or shell furrow and the unit of measure used--mils or degrees. The direction is measured from the observer to the enemy weapons.
- (4) Items D and E.--Gives the time that the shelling started (D) and the time it ended (E). These times should be determined accurately since they may tend to verify other reports of hostile weapons activity from flash and radar ranging sections.
- (5) Item F.--Gives the location of the area shelled by coordinates or other reference.
- (6) Item G.--Gives the number, caliber (or size), and type of guns, mortars, missiles, or aircraft involved in the shelling or bombing.
- (7) Item H.--Gives the nature of the fire; classified as interdiction, harassing, neutralization, or destruction.
- (8) Item I.--Gives the number and types of shells or bombs involved in the attack.
- (9) Item J.--Gives the time from flash to bang, which is the number of seconds between the time the flash of the weapon is seen and the time the detonation is heard.
- (10) Item K.--Gives a brief statement of the damage that occurred as a result of the shelling or bombing. This information should be encoded.
- (11) Item L.--Same as item A.

(12) Item M.--Gives location of the hostile weapon(s) by grid reference and to the nearest meters.

(13) Item N.--Gives reporting source or agency that located the hostile weapon(s).

(14) Item O.--Gives period of time that the hostile weapon(s) was active in location given in item M.

(15) Item P.--Same as item G.

(16) Item Q.--May give area shelled or other information that may be deemed appropriate.

(17) Item R.--Gives start of counterfire.

(18) Item S.--Gives identification of counterfiring unit.

(19) Item T.--Gives the quantities of rounds and their shell and fuze combinations.

(20) Item U.--May give reporting or observation agency or other information that may be deemed appropriate such as damage assessment if available.

c. Transmitting the Counterfire Report.--Since speed is essential to counteraction, information is transmitted by the most rapid means available in the sequence shown above. Each report is preceded by the appropriate code word; i.e., shelrep, mortrep, or bomrep. For ease and speed of reporting, each item is identified by the alphabetical designation. For example, if the nature of the fire is undetermined, item H is transmitted as "Hotel, unknown." All items of the report are transmitted in the clear except items A, B, and K. If the level of damage is so extensive that it affects current operations, item K may be reported separately as a flash message.

#### 2405. CRATER ANALYSIS

A great deal of usable information can be obtained from an analysis of shell craters. The detonation of an artillery or mortar shell, in average soil, produces a crater with certain characteristic markings, which vary with the type of shell, the terminal velocity of the shell, and its angle of impact. Because of irregularities of terrain and soil conditions, the typical shell crater is the exception rather than the rule. The most distinctive shell crater patterns are usually found on flat terrain, where the soil is relatively firm.

a. Plotting.--From an analysis of craters, it is possible to determine the approximate direction to the weapon that fired the projectile. It is possible to determine the direction to a weapon with reasonable accuracy from the analysis of a single crater. The most accurate locations are obtained by plotting the intersection of rays obtained from two or more widely separated craters of the same group of fires.

b. Markings.--Marks on the ground surrounding the crater are caused by fragmentation of the projectile. These markings are called side-spray and base-spray markings. The side-spray markings are pronounced from the



detonation of a gun or howitzer shell, while the base-spray markings are negligible. The reverse is true of fragmentation markings made by mortars.

c. Methods.--Shell craters are classified generally as ricochet furrows, shell craters, and mortar craters. General characteristics of craters and methods of determining direction are described in the following paragraphs:

(1) Ricochet Furrows.--A ricochet furrow (see fig. 11) is caused by a shell striking the ground at a small angle of fall and rebounding into the air before detonating. This furrow, because of its distinctive trace on the ground, furnishes the best information. Before using a ricochet furrow, however, it should be established definitely that the shell was not deflected by stones or other objects before or while making the furrow. At the point in the furrow where the shell changes from a descending to an ascending path, it will usually change direction. To determine the direction from a ricochet furrow, the loose dirt is removed from the furrow leaving the smooth, hard channel intact. A stake is driven at each end of the usable, initially straight portion of the channel. These stakes must be set straight so that they barely touch the center line of the channel on the same side. This line of stakes represents the direction of flight of the projectile. An aiming circle (or compass) is placed in line with the two stakes at the end of the furrow where the shell came out of the ground, and the back-azimuth of the line of fire is measured. A ray drawn on a map along this back-azimuth of the line of fire should pass through or near the location of the hostile weapon.

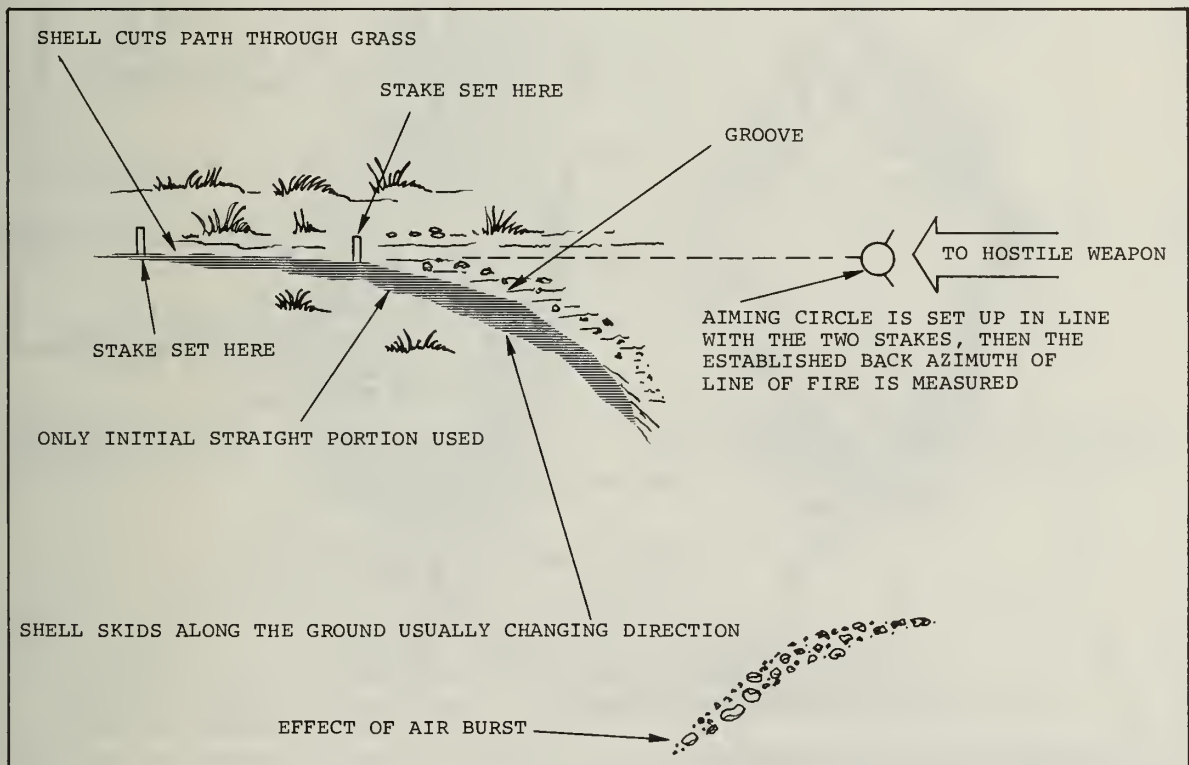


Figure 11.--Typical Ricochet Markings.

(2) Shell Craters.--At small angles of fall, high-explosive shells equipped with a quick fuze produce a crater which furnishes information nearly as accurate as that obtained from a ricochet furrow. This type of crater is relatively shallow and pear shaped with the side-spray pattern clearly defined. As the depth of the crater increases, the reliability of information decreases requiring more crater analyses to obtain effective measurements. Direction to the hostile weapon may be determined by the methods outlined as follows:

(a) Entrance Groove.--A crater is selected which is clearly defined, and the groove made by the shell entering the ground is located. A stake is driven into the center of the groove. (See fig. 12.) The fuze mark is then located on the opposite side of the crater and a second stake is placed in the center of this mark. This line of stakes represents the line of flight of the projectile. An aiming circle (or compass) is placed on the side of the crater with the fuze mark, aligned with the stakes, and the back-azimuth of the line of fire is measured. The back-azimuth is the direction to the weapon. A range pole may be sighted to extend the line of stakes for ease in measuring.

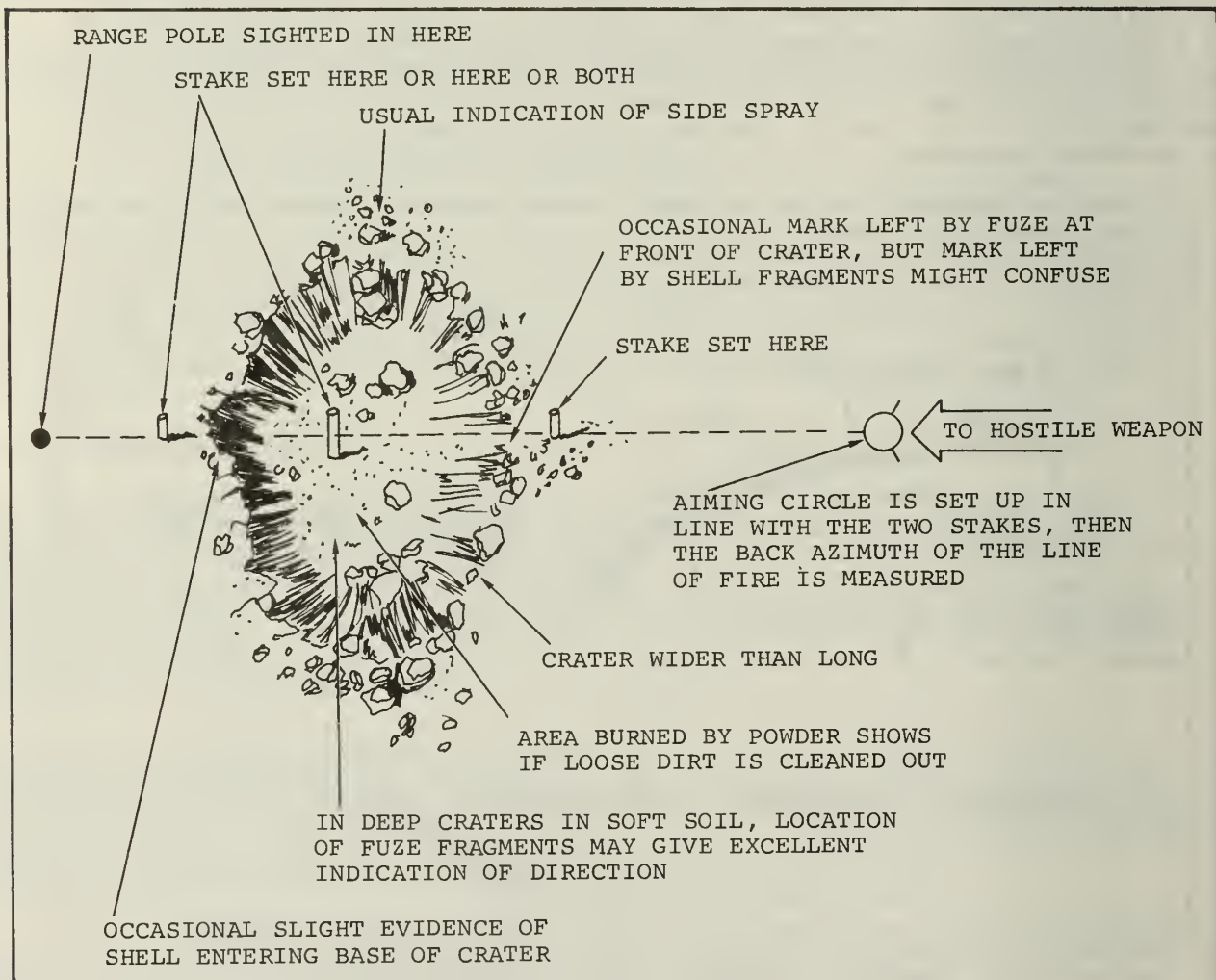


Figure 12.--Direction Determined From Entrance Groove and Fuze Mark.

(b) Side-Spray.--To determine direction by means of the side-spray (see fig. 13), the outline of the side-spray on the ground is located, and a stake is placed at each end of the pattern. These stakes are placed so that they divide the pattern in half. An aiming circle (or compass) is placed in the center of the crater and the angle between the two stakes is measured. One-half of the value of this angle will establish the line of flight of the projectile. This line is marked on the ground by stakes and measured with an aiming circle set up at the front (fuze mark) of the crater and in line with the stakes. The measurement is the back-azimuth of the line of fire and the direction to the weapon.

(c) Averaging Method.--Either of the two methods described in subparagraph (a) or (b) above will produce fairly accurate results; however, the most reliable direction is obtained by taking an average of the direction determined by both methods. The method described in subparagraph (a) is more applicable for use in determining direction from deep craters, where side-spray is not clearly defined. In soft soil, the nose of the projectile will form a tunnel in prolongation of the projectile's line of flight. This tunnel will assist in establishing direction from deep craters in conjunction with the method discussed in subparagraph (b) above.

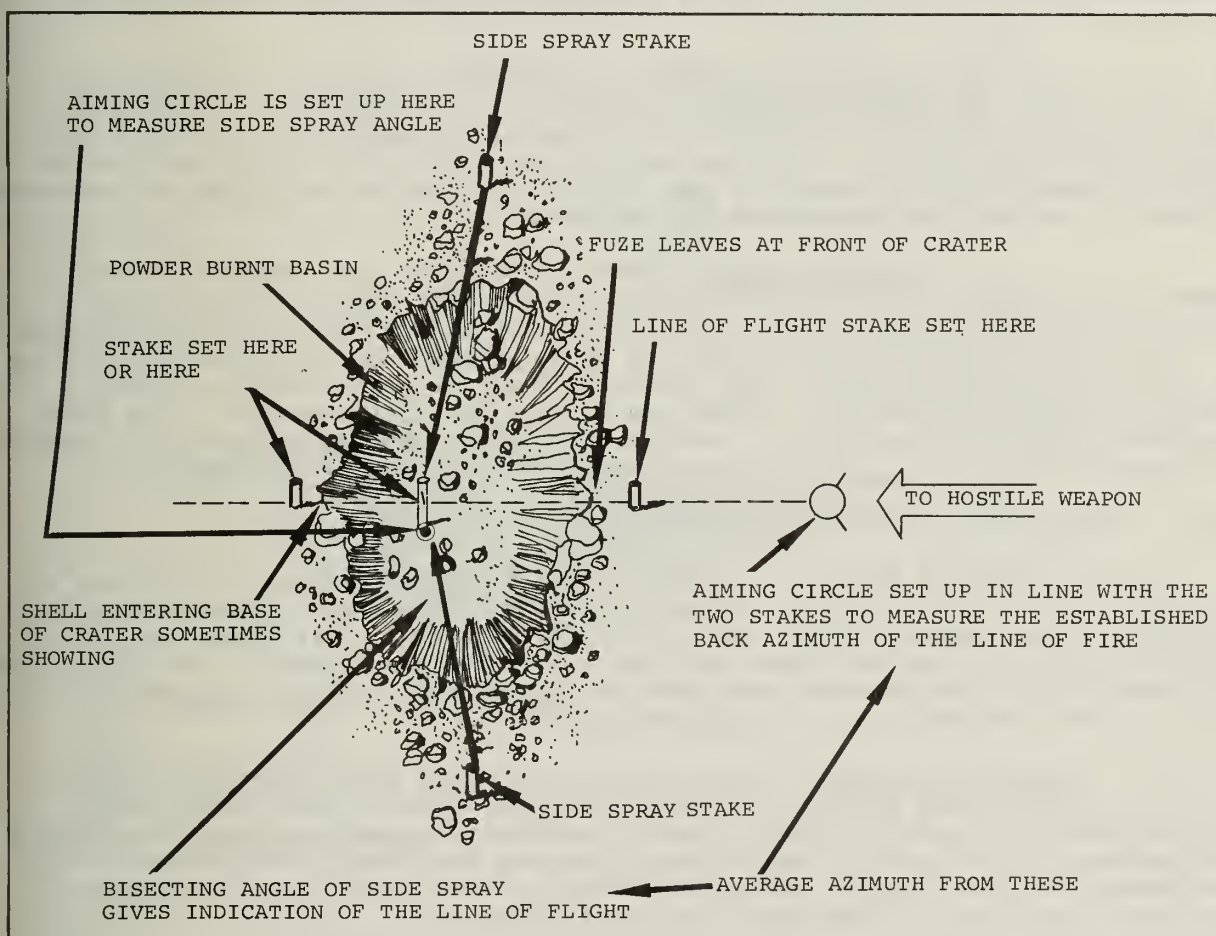


Figure 13.--Direction Determined From Side-Spray.



(3) Mortar Craters.--A mortar crater is nearly circular in shape. The front edge is undercut and the back edge (toward the mortar) is shorn of growth and grooved or streaked by splinters. (See fig. 14.) The ground around the crater is streaked by splinter-grooves which radiate outward from the point of detonation. The ends of the splinter-grooves at the back side of the crater are on an approximately straight line which is perpendicular to the line of flight of the projectile. When fresh, the interior of the mortar crater contains loose dirt which must be removed to disclose the burnt inner crater. The mortar fuze normally buries itself in the bottom of the inner crater forward of the point of detonation. Direction from a mortar crater to the hostile weapon is determined by the following methods:

(a) Point of Detonation.--The point of detonation is first located as indicated in the first illustration in figure 15, and a stake is driven into the crater at the point of detonation. Loose dirt is removed and the fuze tunnel is located slightly forward of the point of detonation. A range pole or straight stick is then laid along the line from the fuze tunnel to the stake. This stick represents the line of fire. An aiming circle or compass is placed in front of the crater (undercut edge) and the back-azimuth of the line of fire is measured to obtain the direction of the weapon.

(b) Splinter-Grooves.--A straight stick is laid along the ends of the splinter-grooves at the rear of the crater, as indicated in the second illustration of figure 15, perpendicular to the line of fire. A second straight stick is laid on top of the first stick forming a right angle and bisecting the crater. The azimuth of the second stick is measured as above to obtain the direction to the weapon.

(c) General Shape.--When a definite and regular crater is formed, a straight stick can be laid along its main axis, dividing the crater into symmetrical halves as shown in the third illustration of figure 15. This stick represents the line of fire; therefore, the back-azimuth is the direction of the weapon. The value of each method described above depends on the conformation of the ground and the type of soil. The best direction is usually found by a combination of all three methods illustrated in figure 15.

#### 2406. IDENTIFICATION OF SHELL FRAGMENTS

The caliber of a shell, as well as the type of weapon from which it is fired, can be determined by analysis of its fragments. Dimensions of projectiles vary with caliber and type. Identification is possible if suitable fragments can be found and their measurements taken. The tail fins of mortar shells provide the best indication of type. Mortar fragments indicate the type and size of rockets and missiles.

a. Fragments Sought.--Caliber is determined best from duds; next best from underformed or slightly deformed fragments of low order burst. Shell detonation usually distorts and stretches fragments; therefore, thick base sections which have rotating band grooves are most informative. With experience, caliber can be fairly accurately determined from fragments of high order burst which have rotating band grooves.

b. Rotating Bands.--The pattern or rifling imprints, width, number, and size of rotating band or bands, and dimensions of keying or knurling

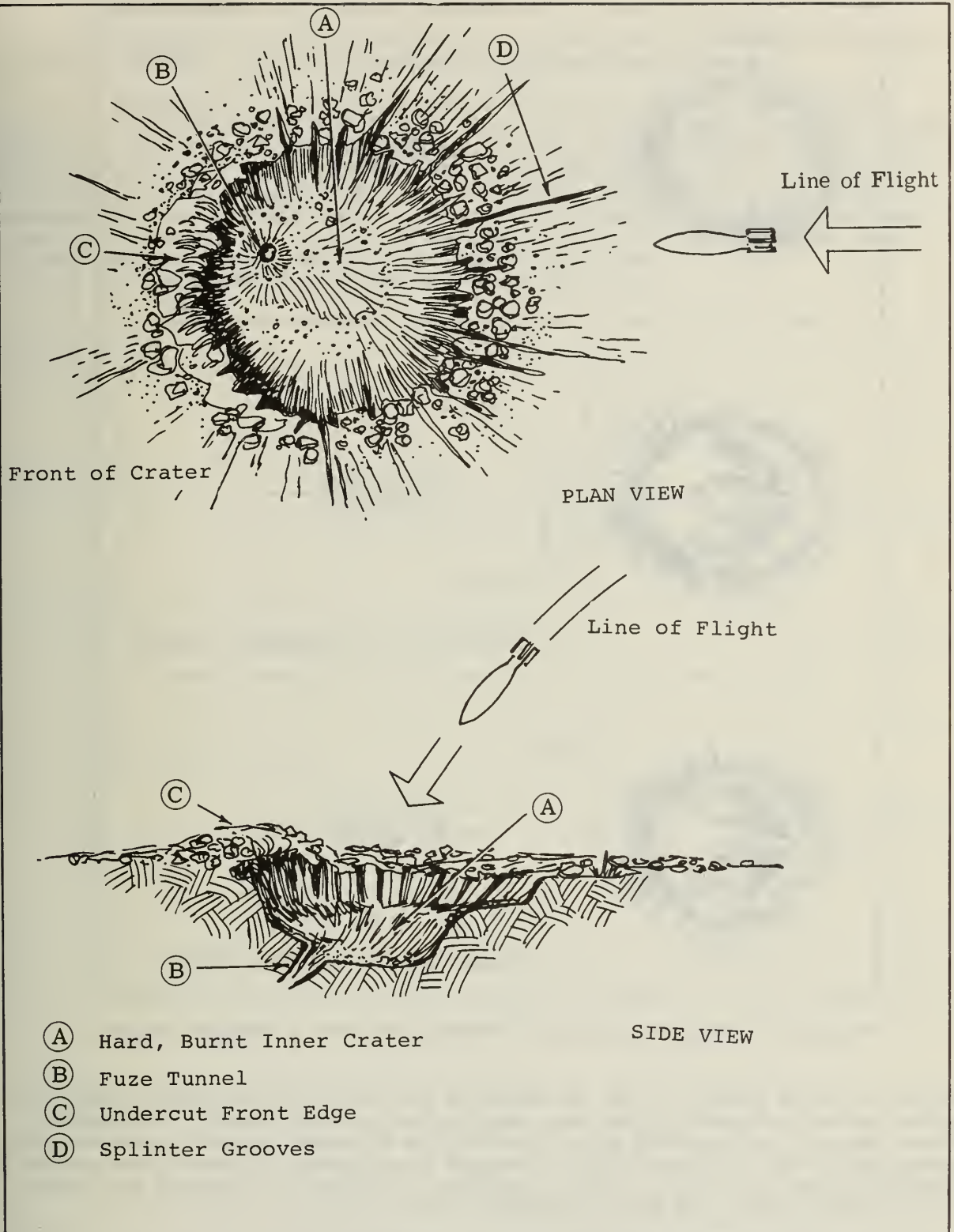


Figure 14.--Typical Mortar Crater (Schematic).



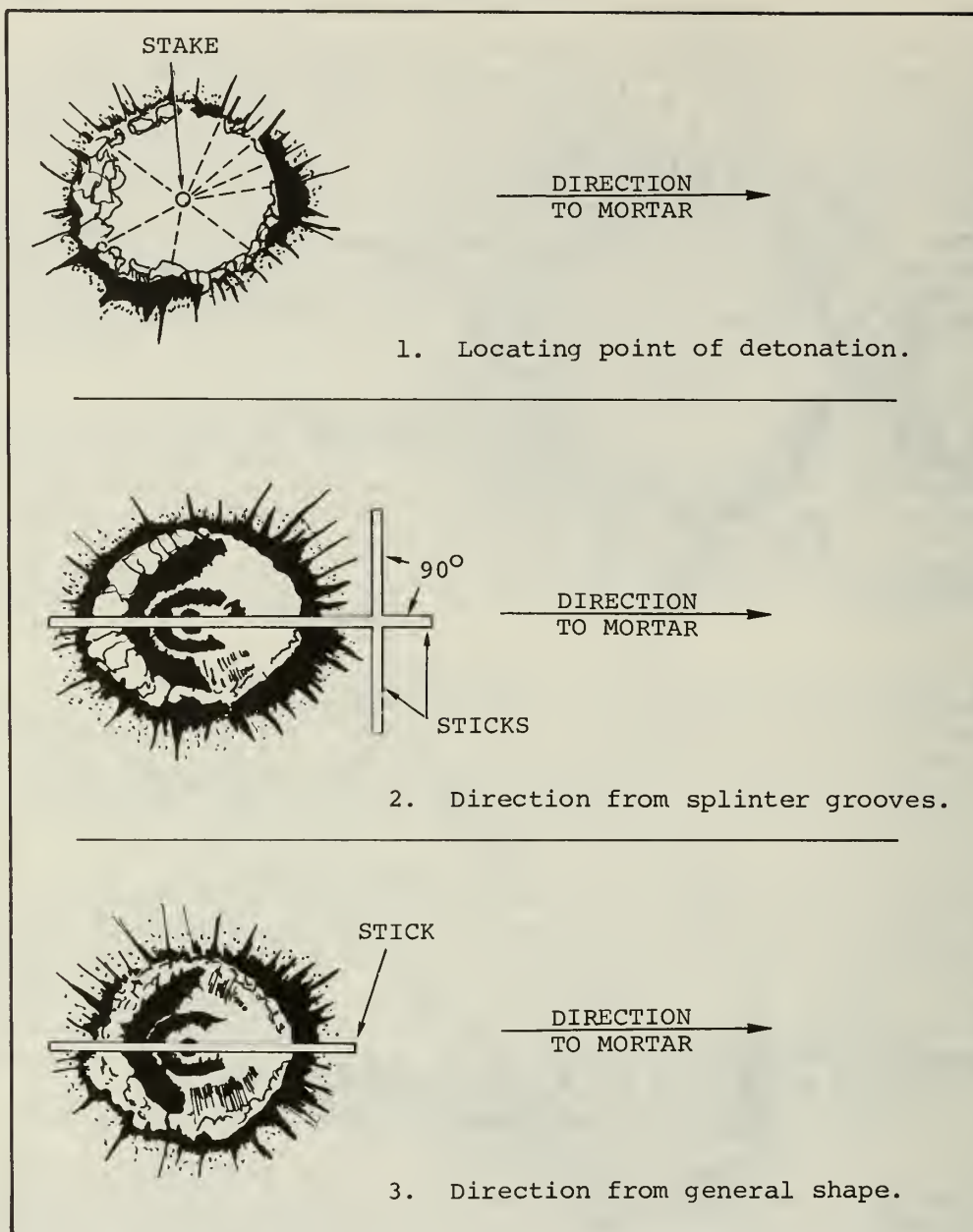


Figure 15.--Determination of Direction From a Mortar Crater.

within the band groove or on the back of the band are excellent identifications of the caliber, type, and nationality of the shell. The width of the imprint of the band plus that of its adjacent groove is an indication of caliber. If each hostile weapon has a width of band plus groove different from that of all other calibers, a table of calibers and their corresponding band plus groove widths can be prepared.

c. **Fuzes.**--In deducing caliber of shells, information obtained from fuzes and fuze fragments must be considered cautiously as the same fuze may be used with a number of different caliber shells.

d. Crater.--The width and depth of the crater give some indication of caliber; however, this is generally considered unreliable.

e. Templates.--A template can be made for the determination of diameter of shell fragments. Little training is required to use templates properly; however, care must be taken in selecting fragments. Most fragments have had their original curvature changed by the detonation of the shell resulting in a deformation that is difficult to detect. Caliber determined by use of templates is accepted with caution unless confirmed by additional evidence. It may be easier to classify template caliber by light, medium, heavy, and very heavy projectiles.

## Section V. COUNTERFIRE ACTIVITIES

## 2501. GENERAL

Counterbattery and countermortar operations are centralized at the lowest echelon of artillery capable of effective counterfire efforts. In the division, counterbattery operations will normally be centralized at the artillery regimental fire direction center and countermortar operations at the artillery battalion FDC. When small landing operations are planned, the artillery battery or battalion, as appropriate, must assume responsibility for both counterfire missions. Fundamentally, an effective counterfire system must exist in all tactical organizations of the Fleet Marine Force. The commander landing force, regardless of the size operation, must insist on a system incorporating all tactical organizations into a plan to combat the effectiveness of the enemy fire support means.

## 2502. RESPONSIBILITIES

The inherent responsibility of counterfire must be considered in the composition of the artillery organization for combat. The artillery officer recommends to the supported infantry unit commander an organization and plan for counterbattery/countermortar operations.

a. Where threat of hostile artillery exists, the composition should reflect a counterbattery fire means. Accordingly, medium or heavy artillery in an amount to effect the counterbattery program of the landing force must be included.

b. The S-2 is primarily responsible for the countermortar/counterbattery activities of the command.

(1) The artillery battalion S-2 is normally designated as the countermortar officer (CMO); the regimental S-2 is usually designated as the counterbattery officer (CBO). When the battalion is the senior artillery echelon of a task organization, the S-2 is designated as the CBO/CMO.

(2) The artillery S-2 and the landing force G-2 have joint responsibility for obtaining information. Repositioning of artillery with the landing force may be dictated by the capability of the enemy long-range artillery. Information on enemy nuclear delivery capability must be sought vigorously.

## 2503. POLICY

This is the commander's concept of the employment of his artillery in the counterbattery/countermortar role. The commander landing force may state the counterbattery policy, allowing his subordinate commanders to state a countermortar policy that suits their individual situations. The types of counterbattery/countermortar policies are active, silent, and semiactive.

a. Active Policy.--Counterbattery and/or countermortar fires are delivered on all confirmed or suspected hostile artillery or mortar positions as soon as they are located.

(1) Advantages

- (a) Helps to sustain morale of friendly troops.
- (b) Assists in retaining control of the battlefield.
- (c) Decreases the effectiveness of hostile artillery and mortars by forcing the enemy to displace.
- (d) Allows the enemy little time to organize his positions.

(2) Disadvantages

- (a) Prevents delivery of surprise fire on a number of positions by our counterfire means.
- (b) Increases artillery ammunition expenditures.
- (c) Allows the enemy to locate our own artillery positions over a period of time.

b. Silent Policy.--Counterbattery and/or countermortar fires are withheld until a definite program is prepared. These programs are disseminated and counterfires are delivered during a short period of time.

(1) Advantages

- (a) Permits intelligence agencies time to collect the maximum counterfire information.
- (b) Permits the delivery of surprise fires and prevents the premature disclosure of friendly artillery positions.

(2) Disadvantages

- (a) Gives the enemy artillery and mortars more freedom of action.
- (b) May be detrimental to the morale of friendly troops unless they understand the purpose of the policy.

c. Semiactive Policy.--A semiactive policy consists of a compromise. For example, counterfire is withheld except on hostile batteries whose fires are causing damage to friendly installations. Units that have been in position for some time may follow an active policy. Units occupying new positions normally follow a silent policy to avoid disclosure of their locations.

## 2504. CRITERIA AND METHOD OF ATTACK

Counterfire criteria define the information necessary to establish a "suspect" hostile artillery or mortar location and the information required to "confirm" it. The criteria must meet each tactical situation. The criteria for hostile artillery locations may be the same or differ materially from that for mortar locations. The standard method of attack is stated by the commander as a specific caliber and amount of ammunition required to destroy and/or neutralize hostile artillery and mortar locations. The criteria and method of attack are stated separately for counter-mortar and counterbattery fires. Their determination is dependent upon the



ammunition, artillery composition, plan of operation, and the situation. The artillery commander may recommend a change in the criteria or method of attack based on the current situation, a desire to mislead the enemy, or to complement a new plan of operations.

#### 2505. ORGANIZATION

a. Duties of the S-2.--The duties of the artillery S-2 as the CBO or CMO are normal intelligence functions, plus:

(1) Provide the S-3 with enemy artillery and mortar locations for counterfire and recommend fire missions.

(2) Assist the S-3 in planning and selecting counterbattery and countermortar targets.

b. Communications.--Speed is essential. In most operations, the artillery intelligence net will be established when counterfire operations are significant. When no intelligence net exists, normal communication facilities and nets will be designated by the commander for counterfire communications. Both infantry and artillery communication facilities are utilized. Counterfire information is urgent in nature and is given precedence immediately after fire missions, except for flash messages.

#### 2506. OPERATIONS

The organization for counterbattery and countermortar operations is decentralized to obtain maximum speed in the delivery of counterfire on enemy mortars and artillery. Coordination between the infantry and the supporting artillery and the exchange of target information can be accomplished in the FSCC. Counterfire missions may originate at various echelons. The infantry S-2 may establish a counterfire information center to effect closer coordination of information with the artillery.

a. Infantry Counterfire Operations.--Immediately upon receiving a counterbattery/countermortar report, the infantry S-2 plots and indicates the target information to the FSCC for relay to the supporting artillery FDC. The infantry S-3 will request counterfire through the FSCC. The artillery representative will forward the request to the supporting artillery FDC. The artillery S-2 (CBO or CMO) reviews the request based on his records and provides the S-3 with all information available on which he can base his decision to fire the mission. Informality often increases the rapidity of counterfire missions, particularly on the infantry and staff levels.

b. Artillery Counterfire Operations.--Artillery counterfire operations are the joint responsibility of the artillery S-2 and S-3. All counterbattery/countermortar information is received and supervised by the S-2. Shell reports are plotted, as received, to provide "suspect" and "confirmed" hostile gun and battery locations. Counterbattery and countermortar records are received for comparison and target prediction. When a decision to request counterfire is made, the fire mission is passed to the artillery S-3 who has responsibility for final approval. The interpretation of targets and the method of attack is based upon the counterbattery/countermortar policy.



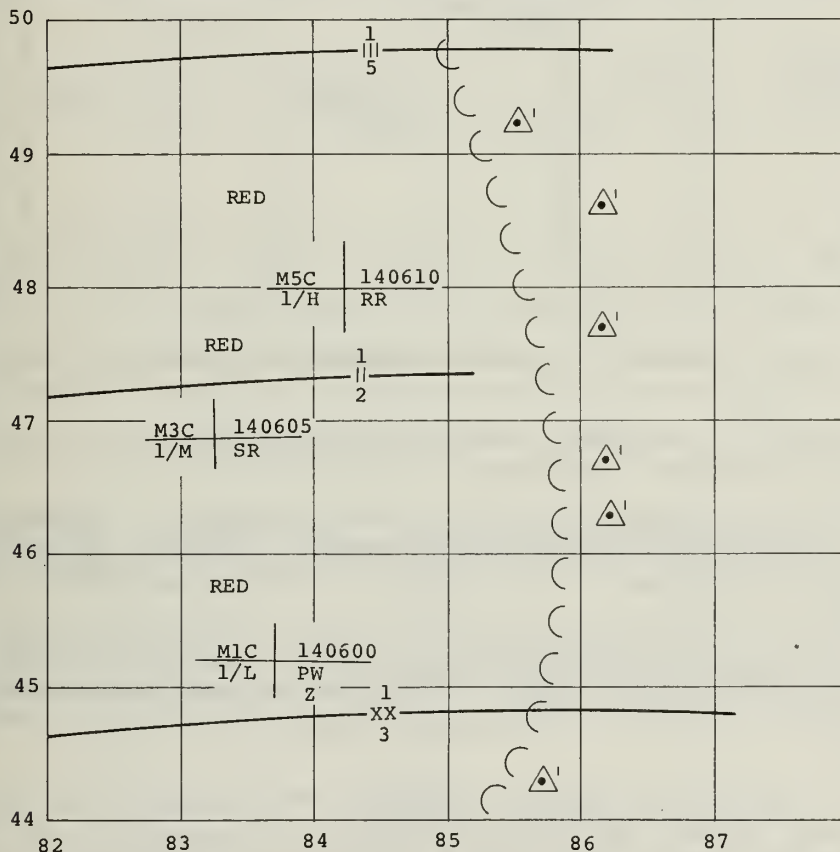
## 2507. RECORDS AND DOCUMENTS

The number of forms, records, and charts maintained should be the minimum required to provide a clear and concise record of hostile artillery and mortars. The artillery counterfire information form is utilized as the initial recording document for much of the information transmitted to artillery intelligence agencies and sources. The ACIF should, if possible, be the primary transmission form of counterfire information of all sources and agencies. Paragraph 2404 provides an explanation of the ACIF.

a. Counterbattery/Counter mortar Records.--Records are essentially the same at any artillery echelon. Descriptions of these records are as follows:

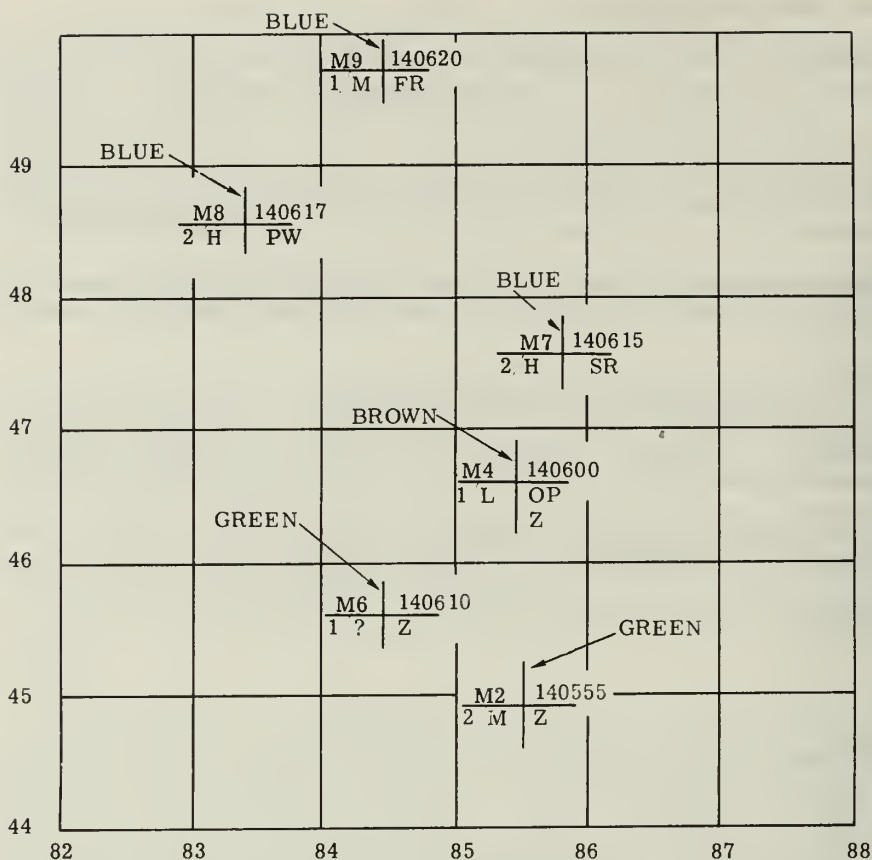
(1) Counterbattery Intelligence Map.--This map is covered with an overlay on which are plotted unit boundaries, friendly frontlines, and all "confirmed" and "suspect" hostile artillery locations. It is normally used in the counterbattery activities at corps and division levels only.

(2) Hostile Battery (Mortar) Chart.--This chart is a map, photo-map, or grid sheet of suitable scale and accuracy which contains unit



NOTE: Information may be placed on an overlay or directly on map.

Figure 16.--Hostile Mortar (Battery) Chart.



Note: Color of plot indicates accuracy of target location.

Figure 17.--Suspect Location Overlay.

boundaries, friendly frontlines, and the plotted locations of all "confirmed" hostile artillery (mortar) locations. (See fig. 16.)

(3) Suspect Location Overlay.--The "suspect" location overlay is attached to and used with the hostile battery (mortar) chart, and it shows the plotted locations of all "suspect" hostile artillery (mortar) locations. (See fig. 17.)

(4) Shelrep (Mortrep) Overlay.--This overlay is attached to the hostile battery (mortar) chart. On it are plotted areas shelled and rays indicating the direction toward the hostile artillery or mortars. (See fig. 18.)

(5) Roving Gun Location Overlay.--The location of enemy roving gun positions can prevent wasteful expenditure of ammunition in the counter-battery program and reveal the enemy's counter-counterbattery efforts.

(6) Target File.--The target file contains a card for each "suspect" and "confirmed" artillery (mortar) location. The complete history of the target to include poststrike analysis is shown on the target

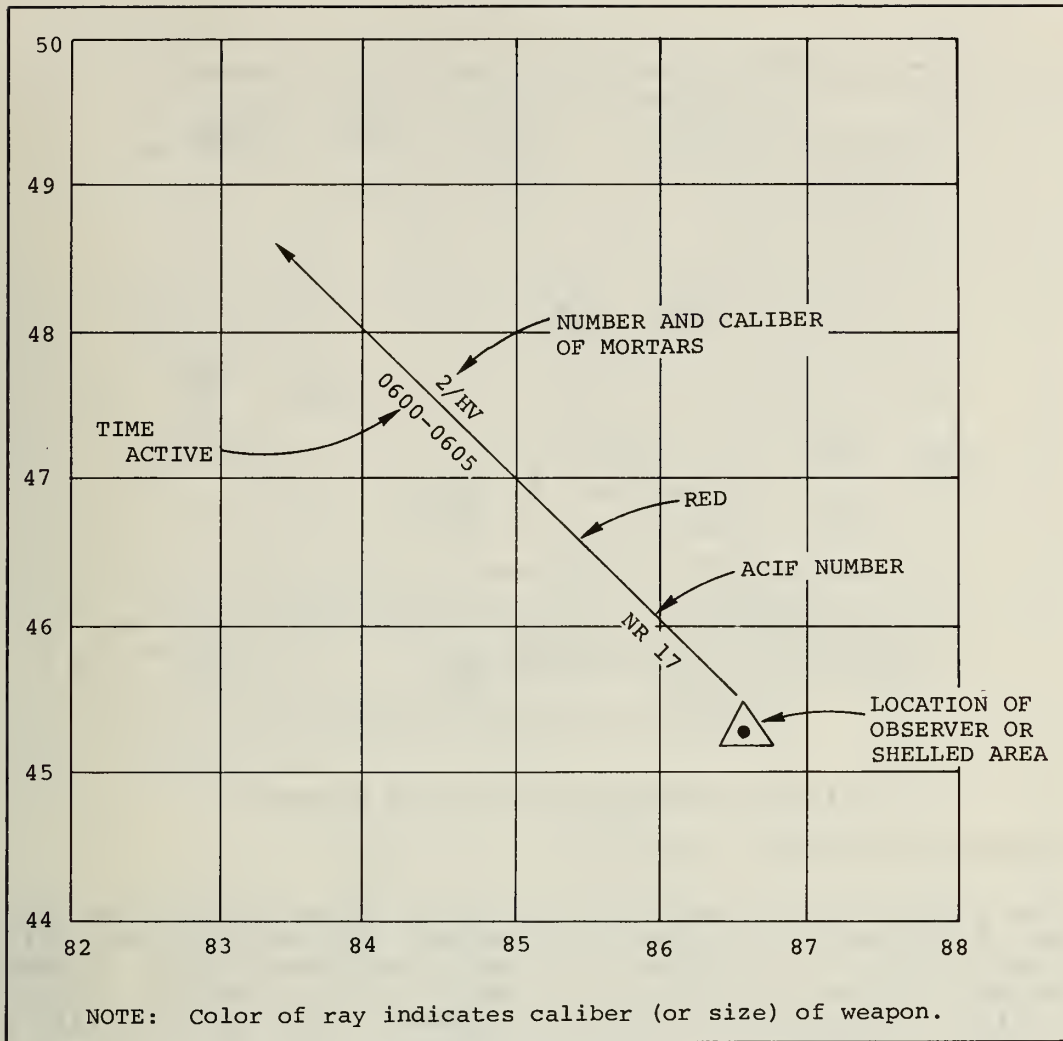


Figure 18.--Shelrep Overlay.

card. "Confirmed," "suspect," and roving gun locations are filed in separate sections of the file. Roving gun locations are retained only in counterbattery files. (See fig. 19.)

b. Documents.--Artillery intelligence documents are discussed in paragraph 2608. Of these documents, the following are particularly useful in providing counterfire information:

- (1) Hostile battery lists.
- (2) Hostile mortar lists.
- (3) Hostile flak lists.
- (4) Artillery intelligence bulletins.
- (5) Target summaries.

Figure 19.--Target File Card.

## 2508. STANDARD NOTATIONAL SYSTEM

a. Plotting Shelling Reports.--All information received on the ACIF or by other means is indicated on the plot. (See fig. 18.) The basic symbol of the plot is a directional ray whose point of origin is the observer's location. If the shelling report is based on a crater analysis, the origin of the ray is the location of the shelled area. The direction of the ray is toward the hostile weapon. In the case of a "flash-bang" report, the ray is drawn and a tick-mark placed at the range corresponding to the time interval obtained by multiplying the elapsed time in seconds between the "flash" and "bang" by 340 (meters/second). Rays are drawn in color to permit rejection of false intersections. (See fig. 20.) The following colors are used:

- (1) Red.--Heavy caliber weapons.
- (2) Blue.--Medium caliber weapons.
- (3) Green.--Light caliber weapons.
- (4) Black.--Unknown caliber weapons.

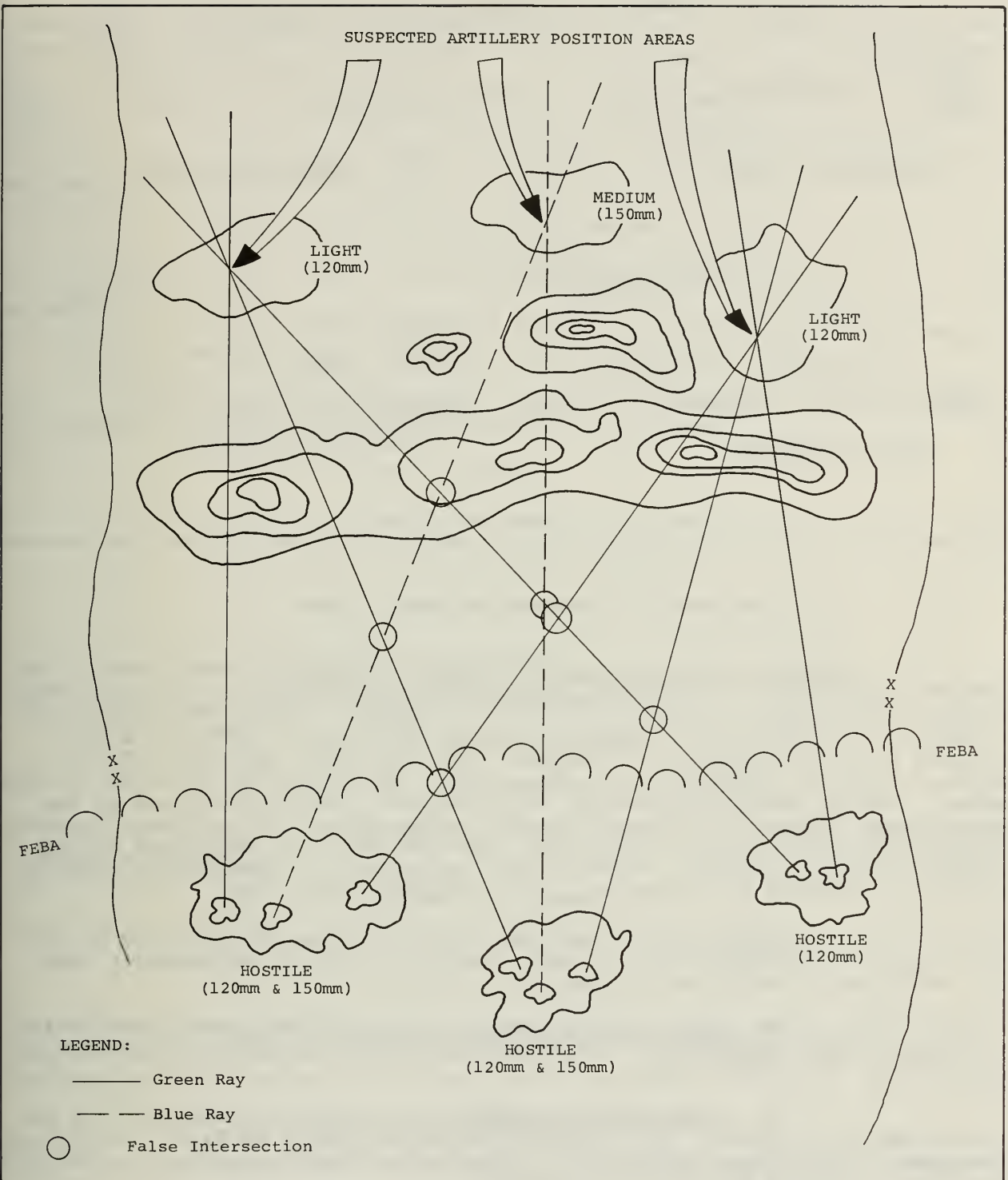


Figure 20.--Example of False Intersection.



		RED (ACCURACY 100 METERS OR LESS)				BLUE (ACCURACY 101-200 METERS)	
(7TH MORTAR LOCATION CONFIRMED)	M7	092100	(DATE-TIME-ACTIVE)	(ARTILLERY 1ST LOCATION)	A	081610	(DATE-TIME-ACTIVE)
(4 MEDIUM MORTARS)	4/M	PI	(PHOTO INTERPRETATION)		1/LT/G	AO	(AIR OBSERVATION)
		Z	(SHELLING REPORT)	(1 LIGHT GUN)			
CONFIRMED MORTAR LOCATION				SUSPECT CANNON LOCATION			
		GREEN (ACCURACY OVER 300 METERS)				BROWN (ACCURACY 201-300 METERS)	
(TARGET NUMBER)	BB0401	181415	(DATE-TIME-ACTIVE)	(27TH ARTILLERY LOCATION)	AZ7	160900	(DATE-TIME-ACTIVE)
(INFANTRY COMPANY)	INF CO	TAO	(TACTICAL AIR OBSERVATION)		1/MR/MSL	PW	(PRISONER OF WAR)
				(1 MEDIUM RANGE MISSILE)			
LOCATION OF TARGET OTHER THAN ARTILLERY OR MORTAR				SUSPECT BATTERY LOCATION			
NOTE: Colors reflect accuracy of location.							

Figure 21.--Completed Target Plots.

b. Plotting Hostile Battery (Mortar) Locations.--Each location reported is plotted. All plotted locations are identified to show the designation of the battery (mortar), date last reported active, the number and caliber of weapon(s), and reporting agency or source. These plots are changed as new information is received and deductions are made. For example, the color of the plot is changed if a more accurate location is determined. When a "suspect" location is "confirmed," it is replotted on the appropriate chart. If a known location is determined to have been vacated, its plot is deleted as a "confirmed" location and it is replotted on the suspect location overlay. Where target locations are reported as vacant, cards are retained in the target file as suspect locations.

(1) Symbol.--The completed plot (see fig. 21) consists of the basic symbol, with notations in each quadrant. The system commonly used for notations is explained below:

(a) Upper Left Quadrant.--Contains the letter combination or target number assigned to the location. Mortar locations designated are preceded by the letter "M."

(b) Upper Right Quadrant.--Contains the date and time the target was last active. This time should be corrected as later reports are received. If the date and time are taken from photointerpretation, the date and time the photo was taken are entered.

(c) Lower Right Quadrant.--Contains the reporting agency or source. If more than one agency or source reports the same target, they should all be shown.

(d) Lower Left Quadrant.--Contains a description of the target.

(2) Color Code.--The accuracy of the location is indicated by the color of the plot as follows:

- (a) Red: accuracy of 100 meters or less.
- (b) Blue: accuracy between 101 and 200 meters.
- (c) Brown: accuracy between 201 and 300 meters.
- (d) Green: accuracy of 301 meters or greater.

(3) Common Abbreviations.--Abbreviations most frequently used to identify reporting source or agency are as follows:

- (a) RR: radar ranging.
- (b) FR: flash ranging.
- (c) Z(g): crater analysis report.
- (d) Z(f): flash report (from single observer).
- (e) PW: prisoner of war.
- (f) AO: artillery air observer.
- (g) TAO: tactical air observer.
- (h) TAF: close air support observation.
- (i) OP: forward observer, artillery observer, and ground observer (infantry).
- (j) II: imagery interpreter.
- (k) Dtv: drone television.
- (l) Atv: aircraft television.

(4) Target Description.--The various calibers of field artillery weapons are set forth in paragraph 1103. The elements of the target description shown below include most normal entries:

- (a) 4/M/H: four medium howitzers.
- (b) 1/?/? : one weapon, unknown caliber, unknown type.
- (c) 3/H/? : three heavy weapons, unknown type.

(d) 4/150/G: four 150mm guns (show exact caliber if known).

(e) AT: antitank gun.

(f) ADA: air defense artillery.

(g) 1/MR/MSL: one medium range missile.

(h) 4/M/M: four medium mortars.

(5) Battery Designation.--Hostile artillery locations are lettered in the order located. The letter "C" is added to the designation when the "suspect" location is "confirmed."

(a) A1: 1st battery location (suspect).

(b) A3C: 3d battery location (confirmed).

(c) A24: 24th mortar location (suspect).

(d) A53C: 53d battery location (confirmed).

(6) Mortar Designation.--Hostile mortars are designated in the order plotted. The letter "M" precedes the lettered designation and the letter "C" is added when a "suspect" location is "confirmed."

(a) M1: 1st mortar location (suspect).

(b) M2C: 2d mortar location (confirmed).

(c) M24: 24th mortar location (suspect).

(d) M52C: 52d mortar location (confirmed).

#### 2509. COUNTERFLAK ACTIVITIES

Counterflak activities are conducted in a similar manner to the counterbattery/countermortar activities. The artillery officer and the air officer at the supported infantry command post plan flak suppression fires to complement the plan of close support aircraft. The artillery intelligence section is responsible for providing the location, type, and capability of weapons in the enemy's air defense means. (See FMFM 7-1, Fire Support Coordination.)

## Section VI. INTELLIGENCE OPERATIONS

## 2601. GENERAL

The operational aspects of field artillery intelligence involve the continuing exploitation of target information for planning, instituting countermeasures, and recommending counteraction against hostile intentions and capabilities. Among these aspects are the necessity for security and concealment of friendly information and installations, misleading the enemy by decoys and tactical ruses, the intelligence aspects of the tactical operations and staff planning, and counterfire operations.

## 2602. COUNTERINTELLIGENCE ACTIVITIES

The field artillery with the landing force possesses a wide and varied capability to mislead and confuse the enemy, both actively as in the counter-counterbattery program and passively as in the use of propaganda. (See FMFM 2-1, Intelligence.)

## 2603. CONCEALMENT AND CAMOUFLAGE

The artillery should make maximum use of concealment afforded by defiladed positions, woods, villages, and other features to prevent detection. Movement during hours of darkness under blackout conditions hinders detection by the enemy and gains surprise. Occupation of position by infiltration may be used during daylight to mislead the enemy. Utilization of as many routes as possible to move artillery makes detection and estimation of the force involved difficult for the enemy. Camouflage supplements natural concealment. The S-2 should inspect positions to determine the effectiveness of camouflage and the degree of camouflage discipline. Light discipline must be stressed. (See FM 5-20, Camouflage.)

## 2604. TACTICAL DECEPTION

There are many ruses, feints, and deceptive measures that may be employed by artillery commanders. (See FM 5-20, Camouflage, and FMFM 2-3, Signals Intelligence/Electronic Warfare Operations.) In order to ensure control at the highest level, such measures must be coordinated with the operations officer for inclusion in the Command Cover and Deception Plan prepared by the G-2/S-3. Some of the ruses commonly used are:

a. Dummy Positions.--When practicable, generally during a defensive situation, dummy positions and installations should be constructed. Flash and sound simulators, activity in dummy positions, and false communication transmissions can confuse the enemy if properly integrated. Employment of communication deception may be authorized only by the highest tactical command authority.

b. False Preparations.--When ammunition and time are available, preparations may be fired to deceive the enemy concerning the time or location of the attack. They may be fired in conjunction with a plan of reconnaissance by fire.

c. Covering Fires.--Fires to cover patrol activity and reliefs of units may be executed. Chemical or smoke may be effectively employed in



the covering fires. Habitual use of covering fires will disclose activities; therefore, care in planning is necessary to preclude enemy suspicion.

d. Counter-Counterbattery Activities.--Misleading the enemy as to the amount, strength, and composition of landing force artillery is best accomplished by the counter-counterbattery program. This requires that all artillery units establish counter-counterbattery and roving gun positions to be occupied and fired from to mislead the enemy as to the number and location of primary position areas. Battery positions are normally occupied by a platoon; however, the battery should occupy the position intermittently. Roving guns may also occupy counter-counterbattery positions.

e. Change of Procedure.--The S-2 should watch for and recommend changes in procedures that may be assisting the enemy. For example, in selecting targets for interdiction or harassing fires, a definite pattern will develop unless care is taken, enabling the enemy to circumvent the fires. Also, abrupt changes in artillery activity normally indicate a relief of unit or shift of firepower to support an attack.

#### 2605. PROPAGANDA

The artillery is concerned primarily with the dissemination of propaganda to the enemy by means of "propaganda" shells.

#### 2606. SECURITY MEASURES

The artillery intelligence officer and the communications security officer are responsible for reporting violations and recommending additional security measures to be placed in effect by the command. He is primarily concerned with security of movements, communication security, and security of documents.

#### 2607. FIRE SUPPORT PLANNING RESPONSIBILITIES

The artillery and supported infantry must be provided lists of targets that may interfere with the plan of operations as well as counterfire targets in order that accurate and comprehensive fire plans may be formulated. The artillery S-2 and S-3 work as a team in planning these fires. Emphasis on target accumulation is instituted by artillery to include reconnaissance by fire. Analysis and prediction of targets are made by the artillery S-2. These targets are classified, and often, the method of attack is recommended to the S-3. The artillery S-2 also works closely with the target information officer in the fire support coordination center to determine suitable artillery targets.

a. Target Prediction.--Target prediction consists of a detailed study of the enemy held terrain to locate areas which contain suitable targets. This study of terrain may be made from available maps, aerial photographs, and aerial or ground reconnaissance. To effectively predict target location, the artillery S-2 must have a thorough knowledge of enemy organization and tactics. Predicted targets are further developed by placing the suspected areas under close surveillance to detect evidence of enemy activity. If it is suspected that hostile artillery or mortars occupy an area, radar surveillance or direct ground observation are used to verify their existence and locations.



(1) Reconnaissance by Fire.--Reconnaissance by fire is conducted to obtain target locations and other information. It is accomplished by probing suspected areas with artillery fire to produce an enemy reaction. Maximum observation and target acquisition means are directed on the area to detect the enemy activity resulting from the fire. Reconnaissance by fire can be used to determine the nature of enemy fortifications. The results of the fires can best be determined by comparing aerial photographs of the fortifications taken before and immediately after the fire is delivered.

(2) Target Acquisition.--All the target acquisition means at the disposal of the artillery S-2 are directed toward the area of intended operation. These sources and agencies are discussed in paragraph 2304.

b. Target Analysis.--Target analysis is the joint responsibility of the artillery S-2 and S-3. It consists of the critical examination of potential surface targets to determine their military importance, priority for attack, degree of damage desired, and the weapons required to inflict the desired damage. The length of time and the amount of detail in making a target analysis depend on the urgency of attack of the target, the amount of information available on the target, and the degree of coordination required. The analysis will range from a rapid mental calculation for targets of opportunity to a detailed written analysis for prearranged fires at division, expeditionary corps, and landing force levels.

c. Factors Influencing Counterfire Programs.--The artillery S-2 provides the S-3 with a sufficient number of counterfire targets for a suitable program of fires. He normally selects those hostile weapons which have most recently been active in the zone of the supported infantry. The following factors will influence the effectiveness of the counterfire program devised by the S-2 and S-3.

(1) Favorable Factors

(a) Rapid transmission of all counterfire information from units located in the zone of action of the supported unit.

(b) Recording the time of most recent activity on locations shown on the hostile artillery-mortar chart and suspect location overlay.

(c) Ability of the CBO or CMO to properly select hostile gun and battery locations based on his experience and knowledge of the enemy.

(d) Effectiveness of the staff coordination between the CBO or CMO and the artillery S-3 in exchanging timely counterfire information.

(2) Unfavorable Factors

(a) Indiscriminate attack of all known "suspect" and "confirmed" hostile locations.

(b) Failure to attack hostile locations which are outside the supported unit zone of action but are capable of firing within that area.

(c) An increase in hostile artillery and mortar activity and the corresponding increase in the volume of counterfire information making the artillery S-2's (CBO or CMO) analysis more difficult.

(d) Excessive expenditure of ammunition with questionable results due to inaccurate location, inadequate target description, and indiscriminate attack of hostile locations.

## 2608. DOCUMENTS

The S-2 is responsible for the preparation or assistance in the preparation of many documents. Staff studies and estimates are examples of documents produced to assist the commander in arriving at a decision. He may prepare a portion of an estimate or study in conjunction with other staff members. Intelligence documents are used by the artillery intelligence officer in target prediction, analysis, and to maintain up-to-date information files.

a. Artillery Target Intelligence Documents.--The following documents materially assist in providing orderly, timely, and valuable target information. They are normally prepared by the highest artillery intelligence echelon.

(1) Hostile Battery Lists.--Hostile battery lists contain the coordinates of all hostile artillery locations detected in the landing force area of operations. (See app. J.) "Confirmed" and "suspect" locations are identified and listed separately.

(2) Hostile Mortar Lists.--Hostile mortar lists show the coordinates of all hostile mortars location in the division or brigade area of operations. "Confirmed" and "suspect" locations are shown separately.

(3) Hostile Flak Lists.--Hostile flak lists show the locations by coordinates of hostile air defense artillery installations. These lists are used in the execution of counterflak programs.

(4) Artillery Intelligence Bulletins.--Artillery intelligence bulletins may be published by the landing force artillery if such a capability exists in the intelligence section. These bulletins follow the standard five-paragraph form, as follows:

(a) Paragraph 1, "General."--Contains frontline progress and friendly activities of interest to artillery units.

(b) Paragraph 2, "Enemy Situation."--Contains information relative to hostile artillery dispositions and strength and information of interest concerning changes in enemy infantry, armor, or air capability.

(c) Paragraph 3, "Enemy Operations."--Contains a general review of enemy artillery operations and a brief resume' of enemy infantry, armor, or air activities.

(d) Paragraph 4, "Miscellaneous."--Contains a statement of weather conditions, review of fire missions, map and aerial photographic information, and new developments in technical and tactical aspects of hostile artillery weapons or methods of artillery employment.

(e) Paragraph 5, "Target Locations."--Contains additions and deletions to the hostile battery (mortar) lists and the general target file.

(5) Target Summaries.--Target summaries consist of hostile battery, mortar, and flak lists and general target locations compiled from the latest available information. Complete target summaries are numbered, dated, and published at the direction of the artillery commander at division, expeditionary corps, and landing force levels. Recommended priorities for each target may be shown on the target summary. If target summaries are not published by artillery intelligence, the information will be contained in other landing force intelligence documents or target summaries.

(6) Artillery Periodic Intelligence Reports (PIR).--In the absence of instructions to the contrary, the report covers a 24-hour period. The artillery periodic intelligence report is issued only by the artillery of a landing force of expeditionary corps size or larger. In all smaller operations, the landing force intelligence PIR's will fulfill this requirement.

b. Other Artillery Intelligence Documents.--The artillery intelligence section will prepare annexes, appendixes, staff estimates, and make such studies of the area of operations as required and directed by the commander. The estimate of hostile artillery is the primary estimate prepared by the S-2; nevertheless, portions of all staff estimates must be based on intelligence relating to the artillery, thereby requiring his assistance in preparation. (See FMFM 2-1, Intelligence.)

(1) Estimate of Hostile Artillery.--When the estimate of hostile artillery is desired prior to landing force engagement, the estimate must be based upon the limited intelligence and information available. The artillery composition of the enemy is primarily based on high level intelligence information of troop strength and disposition. Accordingly, the deductions derived are based on administrative organization of the enemy forces and knowledge of the enemy considerations in organization for combat.

(2) Staff Studies.--Staff studies by the intelligence officer of the roads, bridges, observation capabilities and limitations, rivers and beaches, position areas, and firing restrictions of enemy areas may be made. Such studies may be of use in arriving at enemy artillery capabilities, target prediction, and target analysis or in making recommendations regarding our own organization for combat and tactical employment. These studies may be included as a part of the artillery intelligence annex or appendix.

(3) Artillery Intelligence Annex or Appendix.--The artillery S-2 is responsible for preparing an intelligence annex to the artillery operation plan. There will often be original intelligence of particular significance to the artillery, based on staff studies made by the S-2. If the commander desires, he may require the S-2 to prepare an artillery intelligence appendix to the artillery annex for the landing force order. However, this information can be properly placed in the landing force intelligence annex. The artillery officer and the G-2 of the landing force will determine the necessity for the artillery intelligence appendix.

## 2609. AIDS, MAPS, AND TOPOGRAPHIC CONTROL

a. The landing force intelligence officer is responsible for the procurement and distribution of intelligence aids and materials. In addition, he is responsible for determining the types and numbers of maps and charts necessary to support the force, and for coordinating with the landing force supply officer for their storage, handling, and issue, both ashore and afloat. The artillery S-2 functions in an identical manner in satisfying the needs of artillery units.



b. The artillery S-2 also procures and maintains trig lists for issue to survey personnel. If artillery is charged with the responsibility for maintaining trig lists for the landing force, the S-2 ensures that other interested landing force elements are informed of changes and additions as necessary.





### CHAPTER 3

#### OPERATIONS

##### Section I. GENERAL

#### 3101. INTRODUCTION

Artillery operations encompass training, planning, and execution. The control and coordination of artillery fire support are a major contribution of the operations section of the artillery unit. The commander's ability to influence the action by firepower is exercised through the fire direction center. The tactical decisions involving artillery and fire planning for the supported infantry unit are executed here as well as the computation of firing data. Training syllabi and schedules are coordinated, approved, and issued by the operations section. In combat, training is reflected in the capability of the unit to provide continuous, accurate, and massive fire support in response to infantry requests. The operations section is the very "heart" of the artillery unit as the vital link between the artillery and infantry in the maneuver of artillery fire support to complement the scheme of maneuver.

#### 3102. ORGANIZATION AND FUNCTIONS

Artillery operations are organized primarily under three subdivisions: fire direction, fire planning, and training. These vital functions are supervised by the artillery operations officer (S-3). The S-3 is assisted by several officers detailed to the operations section. Assistant operations officers are not generally provided in the table of organization in sufficient quantity to efficiently perform all the requirements of the section. Therefore, officers with related specialties may be assigned in an additional duty status. The duties of the S-3 are contained in paragraph 1308c. The operations officer works very closely with the artillery commander and ensures that the staff and batteries are complying with SOP's,

training schedules, and the commander's guidance. As the gunnery officer, the S-3 is responsible for establishing procedures, training, and supervising FDC teams in gunnery techniques. The artillery fire support plan is supervised and coordinated in the final phase of formulation by the S-3. The S-3, as the training officer, must supervise the overall training program to ensure that an acceptable level of proficiency is reached and that the artillery functions as a team. He normally supervises safety requirements and reviews and approves safety cards and diagrams. For information on SOP's, see FMFM 3-1, Command and Staff Action.

### 3103. STAFF COGNIZANCE AND COORDINATION

The S-2 and S-3 must function as a team in all operations. They work together in providing information and intelligence to each other. General targets, target analysis, and target prediction by the S-2 assist the S-3 in making an effective program of fires. The S-3 must work closely with the S-4 on the ammunition requirements of the artillery. The S-4 must keep the S-3 fully informed of the current status of ammunition in the command and the resupply capability of the landing force. The communication officer and the S-3 work together to ensure that adequate communications are available to control fires and to provide rapid transmission of calls for fire. The meteorological officer, the survey officer, the radar officer, air observers, and liaison officers are under the staff cognizance of the S-3 and their efforts are generally coordinated through the operations section. The artillery S-3 should be familiar with the desires of the supported infantry unit S-3. He should work directly with him in an effort to provide better fire support. Liaison officers are thoroughly briefed by the S-3 prior to reporting to the supported infantry unit and they should converse often.

### 3104. GUNNERY

The technical aspects of artillery gunnery doctrine for Marine units are not covered in this manual. Standardization of gunnery techniques is accomplished utilizing appropriate U.S. Army Field Manuals of the field artillery series (FM 6-). These manuals are approved for use by Marine Corps artillery units and are applicable with only minor modifications necessary as a result of differences in organization and equipment. The aspects of gunnery contained in this manual reflect the framework of the Marine Corps' tables of organization and amphibious mission. Safety regulations are contained in Army Regulations (AR 385-63). Safety officer procedures are set forth in FM 6-40, Field Artillery Cannon Gunnery. See also appropriate field manuals for type standing operating procedures for artillery units.

## Section II. FIRE DIRECTION

## 3201. GENERAL

The application, control, and coordination of artillery fire support are exercised by fire direction techniques and executed in the fire direction center. The techniques of fire direction enable the artillery commander to exploit inherent capabilities to attain the principles of economy of force, surprise, maneuver, and mass. Fire direction may be centralized or decentralized to meet the needs dictated by the situation and plan of operation. Centralized fire direction is normally desirable to provide a rapid means of massing the artillery fires of the landing force. Communications of the fire direction center must provide a continuous means to control subordinate units and to receive requests for fire support. The curtailment of communications is a major factor in decentralizing control of firing units. The FDC is established and operated to ensure:

- a. Continuous, accurate, and timely fire support under varying conditions of weather, visibility, and terrain.
- b. Coordination of subordinate units' fires and integration of the artillery fire plan with air and naval gunfire through the efforts of the artillery liaison officer with the FSCC of the supported unit.
- c. Flexibility sufficient to engage all types of targets.
- d. Prompt massing of fires of all available units in any area within range.
- e. Rapid delivery of fires within the zone of the supported unit.
- f. Control of artillery fire through orders, policies, and priorities and by means of adequate liaison and communications.
- g. Implementation of safety measures.
- h. Target information.

## 3202. TECHNIQUES

There are two fire direction techniques utilized in approving a call for fire as a fire mission and converting it to firing data. Tactical fire direction is exercised by FDC's at every echelon and is the only fire direction technique employed in the FDC at the artillery regiment and higher. Technical fire direction is exercised by FDC's directly controlling the firing units; i.e., artillery battery and battalion FDC's.

- a. Tactical Fire Direction.--The exercise of tactical command of one or more artillery units in the selection of targets, designation of units to fire, and the allocation of ammunition for the mission. Tactical fire direction technique may be exercised at any level of command according to the responsibility for control and the origin of the mission. The battalion fire direction center will conduct tactical fire direction of its organic and attached units when it possesses the ability and there is a necessity to do so. Higher echelons exercise tactical fire direction when assigning



missions to subordinate units or when responding to requests for reinforcing fires from subordinate or supported units.

b. Technical Fire Direction.--The conversion of calls for fire into firing data and fire commands. Artillery batteries, battalions, and heavy artillery platoons possess the capability to perform technical fire direction. The commanding officer designates the echelon which will exercise primary technical fire direction responsibility.

### 3203. CONTROL

Fire direction control may be centralized or decentralized. Control should be centralized at the highest level consistent with the capability of the FDC to maneuver and mass fires of two or more subordinate units. Unreliable communications with subordinate units may necessitate decentralization in whole or part. For example, when communications exist where the artillery battalion receives missions, but firing data is difficult to transmit, it is best to decentralize control of technical fire direction while retaining centralized control of tactical fire direction. When communications become unreliable, resulting in calls for fire being difficult to receive and firing data not being satisfactorily transmitted, decentralization of control of tactical and technical fire direction is normally necessary. Some of the methods of exercising control over tactical and technical fire direction in the artillery battalion and battery FDC's are:

- a. Centralized tactical and technical control.
- b. Centralized tactical and decentralized technical control.
- c. Decentralized tactical and technical control.

### 3204. FIRE DIRECTION CENTER

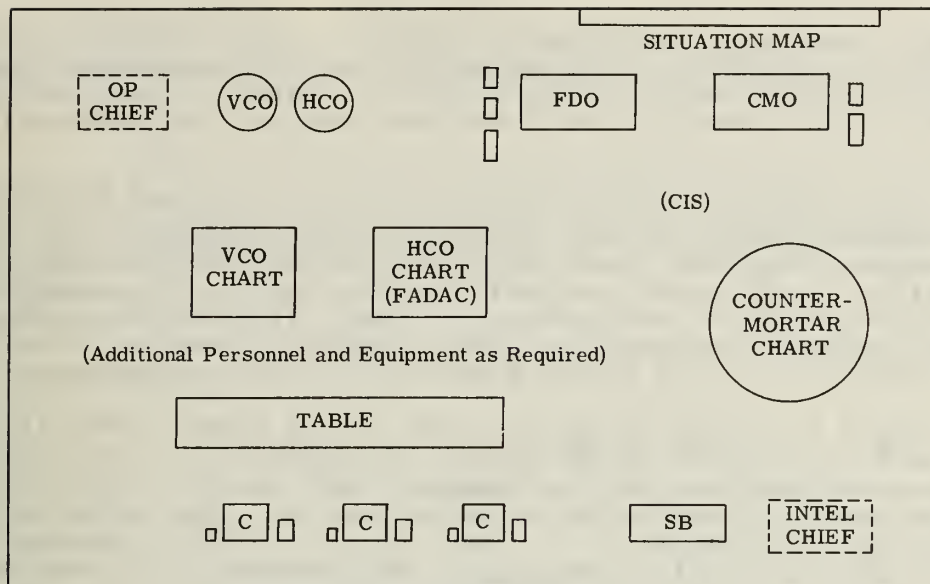
The artillery fire direction center is that element of the artillery command post that consists of operations, intelligence, and the necessary communication personnel and equipment by which the artillery commander directs artillery fires. Details concerning the technical operations of FDC's are contained in FM 6-40, Field Artillery Cannon Gunnery. The location of the FDC in the artillery command post is discussed in chapter 5 of this manual. The organization of the FDC is varied to meet the requirements and conditions existing at each artillery headquarters. (See fig. 22.)

a. Battery FDC.--The battery FDC possesses the capability of technical and tactical fire direction. Tactical fire direction is exercised by the battery FDC when operating under widely dispersed conditions, as an independent unit, or when directed by higher headquarters. Technical fire direction is as indicated below:

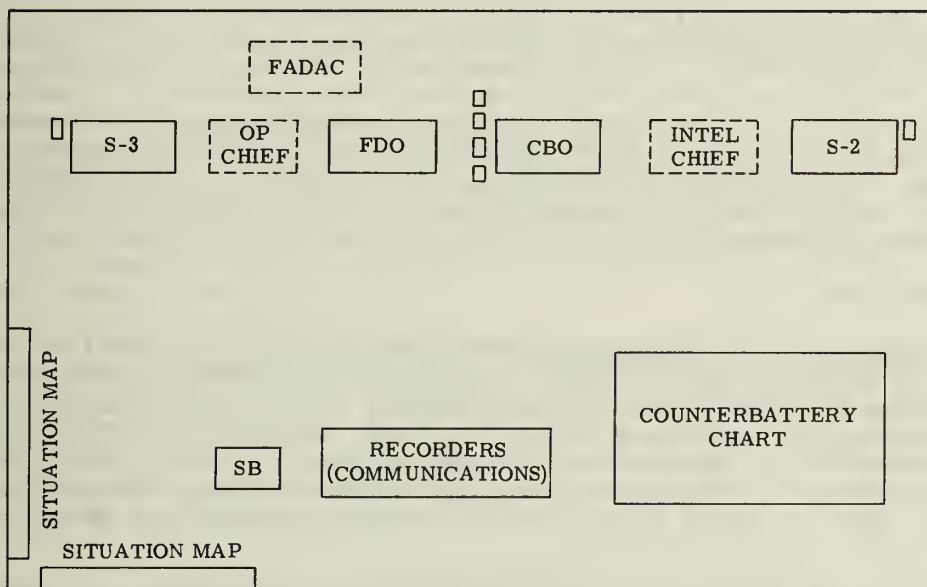
(1) Continuous Operation.--When the parent FDC exercises only tactical fire direction or when otherwise directed by higher headquarters.

(2) Periodic Operation.--When the battalion FDC is exercising both technical and tactical fire direction. Training is provided by permitting the battery to direct designated missions such as registration and destruction. Battery FDC's may be assigned missions when the battalion FDC is handling two or more fire missions and another request is received. Batteries should be permitted to exercise their FDC's periodically to ensure





Technical and Tactical Fire Direction  
(Used by battalion and lower echelons.)



Tactical Fire Direction Only  
(Used by battalion and higher echelons.)

Legend:

FDO - Fire Direction Officer	CIS - Counterfire Information Section
CMO - Countermortar Officer	SB - Switchboard
CBO - Counterbattery Officer	C - Computer (or Computer Recorder)
HCO - Horizontal Control Operator *	☐ - Radio Remote
VCO - Vertical Control Operator	☐ - Telephone

\* The HCO is the Computer Operator in the FDC employing FADAC.

Figure 22.--Typical Fire Direction Center Configurations.

that adequate training is received to attain the fire direction capability for independent operations. The battery FDC may be required to follow a mission controlled by the battalion FDC for training, or as a backup system. Normally one battery FDC will be designated as the alternate battalion FDC.

b. Battalion FDC.--The artillery battalion FDC possesses the capability of technical and tactical fire direction. The artillery battalion always operates a degree of tactical fire direction if possible. However, the possibility of all batteries operating separately, the inability to communicate adequately in some areas, or widely dispersed batteries may reduce this capability materially. Every effort is made to exercise control over subordinate units before decentralizing fire direction.

c. Field Artillery Group FDC.--Due to its normal composition and attachment to a senior headquarters, the group FDC is not directly concerned with coordination with the supported unit or with target intelligence to the same degree as other artillery units. When a FAG is operating as the artillery headquarters for a task force, its FDC functions are similar to that of the artillery regiment. When distances preclude effective control of artillery units by the landing force artillery, the FAG may be called on to assume certain counterbattery functions.

d. Regimental FDC.--The artillery regimental FDC must coordinate closely with the supported unit. Additionally, it is vitally concerned with target intelligence. It coordinates the division counterfire activities to the degree required by the landing force artillery. See paragraph 2502 for counterbattery/countermortar responsibilities. The regimental FDC exercises only tactical fire direction and this to the degree consistent with the communication capability, positioning of units, and range capability. Normally, one of the artillery battalions will be designated as the alternate regimental FDC.

### 3205. OPERATION OF FDC

a. Tactical FDC Operation.--The tactical fire direction center receives fire missions from higher echelons, originates fire missions, and receives calls for fire from organic forward observers. The exercise of tactical command by approving calls for fire, designating units to fire, and the allocation of ammunition for each mission (unless specified by higher headquarters) is performed by the tactical FDC. The tactical FDC performs the many related functions of target intelligence and fire planning.

(1) Responsibility for Tactical Decisions.--Tactical decisions are generally made on "unspecified" missions received from higher headquarters and on calls for fire involving two or more subordinate firing units. The tactical decisions required for the fire order are made by subordinate FDC's in the following circumstances:

(a) When a fire mission has been transmitted by the senior FDC without specific instructions as to units to fire and ammunition to be expended.

(b) When calls for fire are received by an artillery unit operating independent of the parent unit.

(c) On missions originated by the subordinate FDC with centralized tactical fire direction capability and authority to plan fire missions.

(d) When tactical fire direction has been decentralized and reinforcing fires are available without resort to higher echelons.

(2) Processing Fire Missions.--The tactical fire direction center processes fire missions, determining the units to fire and the allocation of ammunition by:

(a) Accurately and rapidly recording the mission and verifying the target location.

(b) Rapidly determining the units to fire.

(c) Making the decision as to the type and number of units to assign and the amount of ammunition to expend on the target.

(d) Contacting all firing units by an expeditious communication system and issuing of a fire order.

(e) Controlling the firing units by time of opening fire.

(f) Receiving and recording ammunition expenditure and surveillance.

(3) Duties of Tactical FDC Personnel.--The S-3 is responsible for overall operation of the tactical FDC. The S-2 is responsible for the overall intelligence operation. He may perform the duties of the counterbattery or countermortar officer when necessary or desirable. The degree of control and the composition of tactical FDC's vary with the unit and its level of command. The personnel that operate the tactical fire direction center are indicated below:

(a) Fire Direction Officer (FDO).--The assistant S-3 is normally the FDO and must be capable of assuming the tactical duties of the S-3 whenever necessary. He is responsible to make certain tactical decisions and to issue such elements of the fire order that may be required to mass two or more subordinate units. He approves missions originated in the FDC and reviews missions requested by higher headquarters. These missions are disseminated to appropriate units to fire.

(b) Nuclear and Chemical Weapons Employment Officer (NCWEO).--The NCWEO is responsible to plan nuclear missions originated in the FDC and to review missions requested by other headquarters. He controls and monitors the fire mission within the unit's responsibility insofar as practicable. He is particularly concerned with troop safety and target effect. He is a member of the operations section and assists the FDO as directed. When the FDO is a qualified NCWEO, he may perform these duties in conjunction with his FDO duties.

(c) Counterbattery Officer.--The CBO is responsible for the counterbattery intelligence activities at the FDC. He is a member of the intelligence section of the artillery regiment, force artillery, or corps artillery headquarters. Duties of the CBO are contained in chapter 2.



(d) Countermortar Officer.--The CMO is responsible for the countermortar intelligence activities at the FDC. His duties are similar to the duties of the CBO and are contained in paragraph 2502. The CMO is a member of the battalion and/or regimental intelligence section(s).

(e) Operations Chief.--The operations chief is the senior enlisted assistant to the S-3. He is responsible to supervise the activities of the enlisted personnel of the FDC. He supervises the installation of facilities, the issuance and care of equipment and supplies, and maintains the operations journal and situation map. He assists the FDO as directed. He is the chief fire direction computer in the technical FDC.

(f) Assistant Operations Chief.--The assistant operations chief performs duties as directed and is capable of performing the duties of the operations chief.

(g) Operations Assistants.--Operations assistants prepare fire control charts, maps, and overlays as directed. They perform duties as chart operators and computers (or computer operators and computer recorders) in the technical FDC and other duties as directed. They may operate telephone or voice radio.

(h) Intelligence Chief.--The intelligence chief is the senior enlisted assistant to the S-2 and is responsible for supervising the activities of enlisted intelligence personnel at the FDC. He is responsible for supervising the installations of the S-2 section in the FDC and for maintaining the intelligence journal and situation map. He assists the CBO or CMO as applicable, and is capable of performing these duties if necessary.

(i) Intelligence Assistants.--Intelligence assistants prepare counterbattery and countermortar charts, overlays, and documents under the guidance of the intelligence chief. They record information in the journal and target files of the intelligence section. They perform other duties as directed.

(j) Switchboard Operator.--The switchboard operator installs and operates the FDC switchboard.

(k) Radio-Telephone Operators.--As necessary.

b. FDO Watch Officers.--These officers perform the duties of the FDO; however, in the event of difficulty or emergency, the S-3 is contacted immediately for guidance and decision. Watch officers must become competent in all aspects of fire direction even though their watch periods are short and generally routine. The watch standers are the assistant operations officers, other staff officers, and battery officers when feasible. Designation of watch standers is made by the commander and the watch list is prepared by the S-3. Where counterfire activities require a continuous watch in the intelligence section, a similar watch list is prepared by the S-2.

c. Fire Support Requirements in the FDC.--In addition to the above, the following additional requirements are fulfilled in the FDC:

(1) Receive and record data from artillery units and other sources pertaining to artillery fire capabilities, enemy and friendly information, and displacement plans.



(2) Maintain an operations map or chart to include location of friendly frontlines, fire capabilities, zones of fire, no-fire lines, and fire support coordination line when appropriate. Disseminate this information to subordinate artillery units.

(3) Maintain an accurate ammunition record of the total expenditures and the amount on hand for designated artillery units. Higher echelon FDC's maintain a record of artillery ammunition received, expended, on hand, and available to the landing force from outside sources.

(4) Prepare fire missions, fire plans, and programs of fires required by the landing force or the supported unit.

(5) Prepare counterfire plans and programs and supervise their execution. Disseminate counterbattery and counter mortar information.

(6) Collect and disseminate target intelligence.

d. FDC Communications.--The fire direction center is the net control and center of field artillery tactical communications. Communications are provided to higher, lower, and adjacent FDC's. Wire systems parallel all command and fire direction radio nets when possible. When necessary to augment artillery communication systems, sole user circuits for fire direction purposes will be provided in the landing force communication system. Instructions regarding the installation and operation of communication systems are published in COI's, COMMSOP's, and other communication instructions. (See chap. 6.)

### 3206. PROCEDURES

Fire direction procedures vary with units and personnel; nevertheless, the principles of fire direction remain the same. The artillery commander and his gunnery officer (S-3) will establish the internal procedures that are peculiar to the situation.

a. Assignment of Fire Missions.--The procedures involved in attacking targets and handling fire missions are discussed in FM 6-40, Field Artillery Cannon Gunnery, and other appropriate artillery manuals. The general procedures pertaining to assignment of fire missions are outlined below:

(1) Artillery Battalion.--The battalion FDC assigns fire missions directly to its organic batteries. When additional fires are required, they are requested from the artillery regiment. When the regiment has assigned a reinforcing unit to the artillery battalion, fire missions are requested directly without reference to the artillery regiment. Attached artillery units operate in the communication net of the artillery battalion and fire missions are assigned by the FDC directly.

(2) Artillery Regiment.--The regimental FDC assigns fire missions directly to its organic battalions, attached, and reinforcing units. When additional fires are required, the landing force artillery FDC or expeditionary corps artillery FDC is notified. Nuclear and chemical fire planning is performed in the regimental FDC in conjunction with the FSCC.

(3) Force Artillery.--Force artillery assigns fire missions to field artillery groups, separate batteries, and battalions retained under

them that have tactical missions of general support, or general support-reinforcing. Force artillery may call on the artillery with the division to participate in important missions. In doing so, the term "all available artillery" is employed, meaning that the fires of those units engaged in more important missions are excluded.

(4) Groups.--Groups assign fire missions directly to their subordinate units. When missions are assigned by force or regimental FDC directly to batteries of the FAG, the field artillery group FDC monitors and records them.

b. Massing Artillery Fires.--The massing of the fires of more than one artillery battery is dependent on common survey or registration for all units. Assignment of units is based on fire capabilities. Centralized control is provided through an adequate communication system to accomplish coordination and control the firing. The FDO allows adequate time for all batteries and battalions to prepare to deliver the fire. The elements of the fire order provide for the desired effect, control, and time of firing.

(1) Units to Fire.--The batteries and battalions capable of firing on a target are determined from the artillery fire capabilities chart (See fig. 23.) In order to avoid diverting direct support artillery from its primary mission, artillery units in general support normally are used when additional fire is necessary. When a unit requests additional fire, the artillery commander, the S-3, or the FDO must decide whether to grant the request. The number of units to fire and the amount of ammunition to be expended are the primary considerations in approving requests for additional fires. The unit requesting the fire is informed of the decision and instructed on details of coordination if the fire is not controlled by the senior FDC.

(2) Target Location Known.--The chart location of the target may be determined by survey, by restitution from aerial photographs, or from a study of the ground by commanders, ground observers, or aerial observers. In assigning mission to units, the FDO includes in his fire order the grid coordinates and altitude of the target, the target number, the nature of the target, the amount and type of ammunition, the method of fire, and the time of opening and/or lifting fire. Fire on these targets is delivered without adjustment whenever practicable.

(3) Target Location Unknown Initially.--A battery or battalion adjusting on an important target may make a request to the FDC of the next higher artillery headquarters for additional fire. When the unit makes this request, it gives the approximate grid coordinates, target number, description of the target, and states that correct grid coordinates and altitude will be reported later. Communications are kept open and the reinforcing units are standing by to provide the requested support immediately. As soon as the requesting unit determines the correct grid coordinates and altitude, the data is sent to the FDC of the next higher artillery headquarters for relay to the participating batteries and battalions.

(4) Method of Attack.--The size and nature of the target will govern the distribution of the fires of the participating artillery units. When the target area is large, each battery and battalion may be assigned a part of the target.

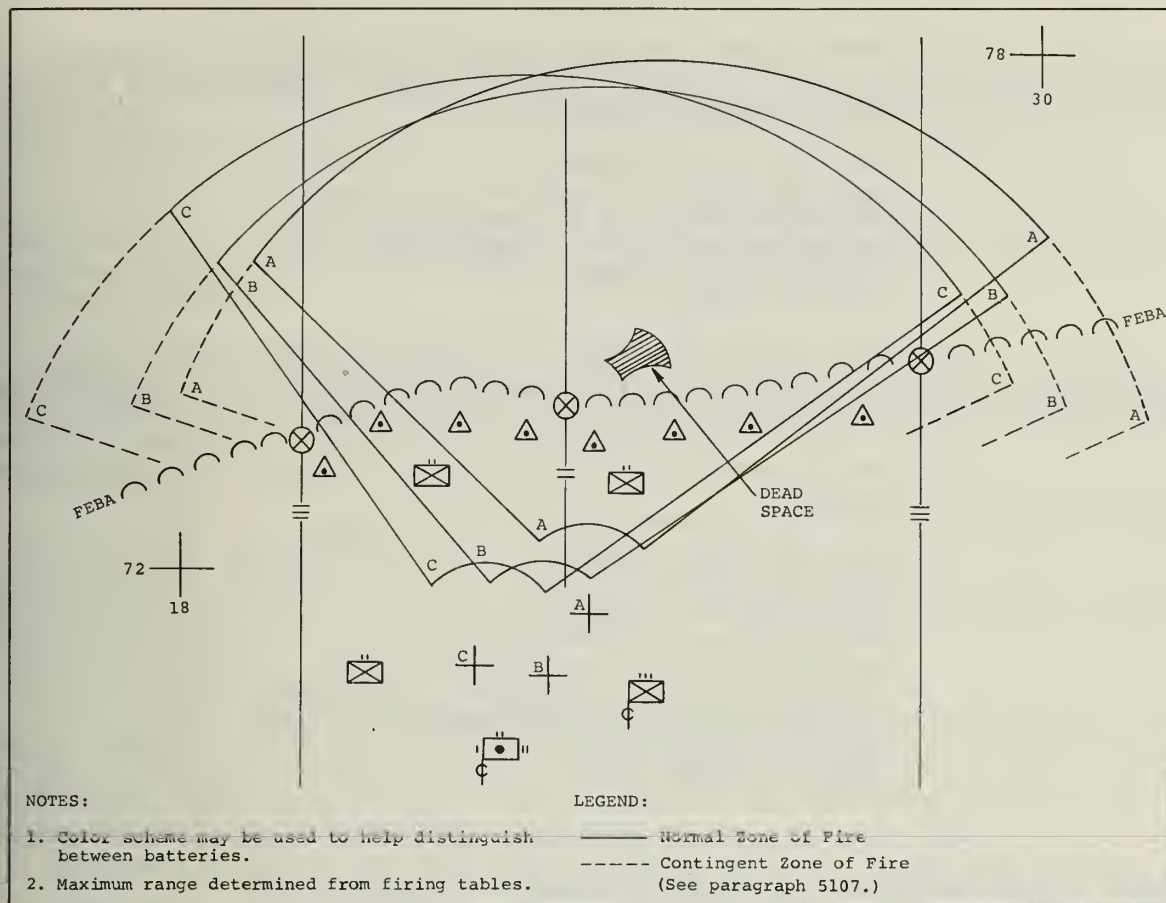


Figure 23.--Fire Capabilities.

(5) Massed Fires in Close Support.--When massing fires in close support of troops, the utmost precaution must be exercised by the FDO. There are inherent inaccuracies in all types of firing charts. Registration near the target or the firing of check rounds on the target may be used to avoid firing on friendly troops. Registration corrections must be kept current, and the FDO must be kept informed of the proximity of fires to friendly troops.

(6) Coordination.--General support or reinforcing artillery FDC's, which have received a mission from an artillery or air observer that is located inside the no-fire line, must coordinate the mission with the direct support artillery unit concerned before attacking the target.

(7) Massing on Target of Opportunity.--The following procedure is used by the FDO in massing the fires of more than one battalion on a target of opportunity:

(a) When a single battery or battalion takes under fire a target of opportunity which requires additional fire, that unit may request additional fire from higher artillery headquarters.



(b) The requesting artillery unit will start the adjustment and send to the FDC of the next higher artillery headquarters a message which will include the following elements:

THIS IS (call sign);  
NOW ADJUSTING ON (nature of target);  
SIZE OF AREA (may be omitted);  
APPROXIMATE GRID ( ), ALTITUDE ( );  
REQUEST ADDITIONAL FIRE;  
TARGET NUMBER ( ).

(c) The higher artillery headquarters S-3 or FDO plots the grid coordinates and, according to his fire capabilities chart, selects the additional artillery units that are to fire the mission.

(d) The selected batteries and battalions are alerted and given the following message:

THIS IS (call sign);  
FIRE MISSION;  
FIRE (number) ROUNDS;  
SHELL (type), FUZE (type);  
APPROXIMATE GRID AND ALTITUDE ( );  
CENTER RANGE ( 1 C APART) (1/2 C APART);  
WHEN READY (or AT MY COMMAND);  
ADJUSTED GRID LATER;  
TARGET NUMBER ( ).

(e) The adjusting artillery unit will complete the adjustment, replot the target if time permits, and send the following message to the next higher artillery headquarters FDC:

ADJUSTED GRID ( );  
ALTITUDE ( );  
NOW FIRING FOR EFFECT;  
TARGET NUMBER ( ).

(f) The adjusted coordinates and altitude are relayed to the other firing units.

(g) When an enemy battery is a target of opportunity and is listed on the hostile battery list, the S-3 (FDO) may transmit the fire mission by referring to the grid square and name of battery shown on the hostile battery list.

(h) After fire for effect has been completed, the adjusting artillery unit may be able to determine that the target has moved or is moving. In this case, the unit FDC may send the following message to the next higher artillery headquarters FDC:

THIS IS (call sign);  
TARGET NUMBER ( ) HAS MOVED (so many) METERS NORTH  
(or SOUTH); (so many) METERS EAST (or WEST);  
REQUEST FURTHER ADDITIONAL FIRE.



c. S-3 Forms, Records, and Charts.--Only tactical fire direction material is covered. Technical fire direction forms, records, and charts are covered in detail in FM 6-40, Field Artillery Cannon Gunnery. Artillery intelligence materials are reviewed in chapter 2 of this manual. Some of the S-3 forms, records, and charts are:

(1) Planning Chart.--The planning chart (a map or map substitute) is a chart used with a target overlay, a fire capabilities overlay (see fig. 25), and copies of fire support plans (artillery, air, nuclear, and naval gunfire).

(2) Situation Map.--A situation map is maintained to keep abreast of the tactical situation. Overlays depicting the friendly and enemy situation and the fire capabilities of the unit or units concerned and fire support plans (artillery, air, nuclear, and naval gunfire) are used in conjunction with this chart.

(3) S-3 Journal.--The S-3 journal is a section journal in which all incidents and messages are recorded with an entry describing the action taken, if any (NAVMC 219-GS). Copies of messages and orders sent and received and the record of fire missions are attached to and become a part of the S-3 journal. At specific intervals, the journal is closed and made a part of the unit journal.

(4) Record of Fire Missions.--Each fire mission handled by the FDC is recorded on the S-3 worksheet (NAVMC 214-DPP). It includes for each target: the target number, source, description, location, unit(s) firing, time fired, type and amount of ammunition fired, estimated effect, and other appropriate information.

(5) Miscellaneous.--In addition to those listed above, there are numerous other forms, records, and charts that may be required and maintained in the FDC or S-3 section. Ammunition and communication status boards, situation maps, shackle keyboard, and others may be utilized to assist in the efficient operation of the section. Forms which assist the FDO and operations personnel in recording fire missions and checkoff lists may be produced; however, they should not be substituted for standard forms that are available or may be reproduced locally.

d. Required Reports.--Certain reports must be submitted to the FDC by subordinate FDC's. These reports assist the senior FDC in the proper supervision of tactical control and application of firepower. The form, content, time of submission, and reporting procedures are generally prescribed in the artillery SOP's. Some of these reports are:

(1) Command Post (CP) Report.--Artillery units are required to report as soon as practicable the time of opening and closing of the command post and the location of the new CP.

(2) Fire Capabilities Report (FIRCAP).--A FIRCAP is made to the next higher artillery headquarters as soon as practicable after occupying position. The report should be submitted by the fastest means available. (See fig. 23.)

(3) Ammunition Report (AMREP).--AMREP's are submitted to the next higher artillery headquarters as directed or prescribed by SOP. These

reports keep the commander advised of the ammunition stock status by number and type of shells and fuzes.

(4) Firing Reports (FIREP).--Upon completion of firing on a significant target, the firing unit may submit a FIREP to the next higher headquarters. Major targets are generally described by order or SOP. A FIREP contains the elements shown below. Items (e), (f), and (g) may be omitted for those missions assigned by higher headquarters:

- (a) Target number.
- (b) Time fired.
- (c) Type and amount of ammunition fired.
- (d) Surveillance of effect.
- (e) Source of target information.
- (f) Description of target.
- (g) Coordinates of target.

(5) Report of Major Target (TAREP).--The TAREP is made by flash message immediately upon location of the target. The report is made to the next senior headquarters and/or as directed by order or SOP. The following format is generally used:

- (a) Location (by coordinates if possible).
- (b) Target description.
- (c) Source of information.
- (d) Action taken.

(6) Shelling Report (SHELREP/MORTREP/BOMREP).--Shelling reports are normally submitted using the format of the artillery counterfire information form covered in detail in paragraph 2404.

(7) Situation Report (SITREP).--A SITREP is a brief report of events giving the situation of the artillery unit for a given time. It is submitted when change in the situation occurs or on specific request of the senior artillery headquarters. Material normally included in the SITREP is:

- (a) Supported unit activities, to include CP location, area of operation, patrol locations, and no-fire lines or areas.
- (b) Major activities of the unit.
- (c) Enemy activities.
- (d) Terrain features, obstacles, or other items which may interfere with the mission of the unit.

(8) Operations Summary (OPSUM).--The OPSUM is a report in brief narrative form covering the combat operations for the previous 24-hour

period. It is normally submitted at a specific time; however, it may be submitted on request of the next senior headquarters.

(9) Unit Report.--Unit reports cover specific periods, submitted on order or in accordance with the unit SOP. It is a four-paragraph report of operations and is complete with references, annexes, and appendixes as required. The artillery unit report normally covers the information contained in appendix H.

(10) Miscellaneous.--Duplication and unnecessary reports are to be avoided. Often, the addition of the requirement to an existing report will suffice. The free flow of information between staff sections and command echelons is not considered additional reports. Generally, the well-informed staff section and command requires fewer additional or formal reports.

## Section III. PLANNING

## 3301. GENERAL

Fire planning is conducted continuously. This planning is pursued simultaneously at all FDC and FSCC levels. Proper fire planning ensures that all artillery is utilized to its fullest capability and exploits the characteristics of the weapons provided. The detail with which artillery fire plans are made depends upon the time available, extent and accuracy of target location, plan of operations, artillery means available, and fire support requirements. Fire planning is coordinated at every level of command. To properly plan the fire support, the artillery liaison officer and fire support coordinator must be familiar with the capabilities and limitations of the means available. They must understand the policies of the commander and possess a knowledge of techniques for effectively implementing these policies.

a. Exploitation.--All means available must be utilized to their best capabilities in order to succeed in battle. This requires an adequate communication system with adjacent and higher units, and with supporting air and naval gunfire. All means, to include survey, radar, flash ranging, and observers must be employed to provide rapid and accurate location and description of targets. The intelligence system must provide target data to the commanders and their staffs. Calibration, registration, meteorological data, and a common grid ensure accurate and timely massing of fires. The ultimate goal is to hit all targets with accurately delivered surprise fires.

b. Intelligence.--All target acquisition agencies and sources must be effectively employed. Special attention is given to the procurement, study, and distribution of aerial photographs. The information obtained will not secure results unless it is properly collected, interpreted, evaluated, and recorded, and the results disseminated to all concerned.

## 3302. FIRE PLANNING CONSIDERATIONS

The artillery fire plan is a part of the fire support plan of the supported unit or force. The objectives of fire planning are to obtain maximum effect from the available artillery support and to ensure coordinated fire support for all maneuver elements of the force. The following considerations must be analyzed:

- a. Mission and scheme of maneuver (or defense) of the supported unit.
- b. Location of the desired fires.
- c. Information of the enemy situation to include size and composition of targets.
- d. Amount and type of artillery and ammunition available.
- e. Other fire support means available and their capability.
- f. Requirements of higher headquarters.



## 3303. FIRE PLANNING PROCEDURES

The full utilization of fire support requires appropriately selected systems, coordination, and control of the means of delivery. The fire support coordination center provides this system with representation of the major arms available to the force. The fire support plan is produced in the FSCC as directed by the supported commander to ensure complete coordination between the plan of operations and the plan of fire support.

a. Planning Objective.--The fire support plan forms a basis for the preparation of the fire plans of the artillery, air, and naval gunfire. An effective fire support plan must accomplish the following objectives:

- (1) Provide adequate support for the supported unit.
- (2) Assign weapons according to their capabilities.
- (3) Furnish massed fires where required.
- (4) Facilitate future operations.

b. Organization for Combat.--As a first step in fire support planning, artillery organization for combat must be prepared. This will include assignment of position areas and direction or sectors of fire. The fire support portion of the commander's concept provides guidance for the integration of fire support with the maneuver portion of the concept, and is the basis of all fire support planning. The artillery, air, and naval gunfire annexes to the operation order are the announcement of the commander's decision for the employment of fire support.

(1) Before recommending position areas, the artillery commander or S-3 should make a map reconnaissance supplemented by personal or reported ground reconnaissance to indicate potential position areas.

(2) The fire capabilities of the available artillery units are determined. A suggested method is to prepare templates representing unit fire capabilities. (See fig. 23.) Utilizing this method, the S-3 can quickly study the possibilities of coverage, considering both the scheme of maneuver and potential target locations. He then can prepare in overlay form a recommendation for artillery position areas and tentative fire capabilities.

(3) The overlay prepared by the S-3 can be superimposed on the S-2 situation map and the target overlay to determine position areas and tactical groupings. An attempt to make decisions without appropriate overlays and charts will often be time-consuming and result in poor decisions.

c. Artillery Preparations.--When the organization for combat is approved, the artillery S-3 can prepare the necessary fire plans. The supported unit commander's concept will include the decision as to whether or not an artillery preparation is to be fired. The artillery officer in the FSCC generally makes a recommendation as to the feasibility of a preparation from the artillery point of view and the amount of artillery and ammunition available. This recommendation reflects the opinion of the artillery commander and his S-3 with whom the artillery liaison officer works. The S-3 prepares the technical aspects of the fire plan. The purposes of an artillery preparation are:

- (1) To gain superiority over hostile artillery.
- (2) To neutralize infantry weapons.
- (3) To disrupt hostile command agencies.
- (4) To destroy communication systems.
- (5) To neutralize enemy observation.
- (6) To destroy camouflage.
- (7) To isolate the battlefield by preventing the movement of reserves.
- (8) To demoralize the enemy.

d. Phases of Fire.--In scheduling a preparation, phases of fire are utilized to accomplish tactical objectives. The preparation is divided into phases to permit concentration of fires successively on various types of targets. The number, order, and length of phases fit the particular situation. The following example is general in nature:

(1) First Phase.--Force artillery, reinforced as required by elements of division artillery, executes counterbattery fires to gain superiority over hostile artillery including rocket and guided missile launching sites. Units not required for counterbattery fires neutralize enemy command, communication, and observation systems. Division artillery units execute counterbattery and countermortar fires.

(2) Second Phase.--Force artillery maintains counterbattery neutralization, fires on command and communication centers, and reinforces division artillery as required. Division artillery maintains countermortar neutralization reinforced as necessary; neutralizes enemy command, communication, and observation facilities; neutralizes defensive areas, weapons, reserves, and assembled mechanized units; and destroys obstacles.

(3) Third Phase.--Force artillery continues counterbattery neutralization fires; units not required for counterbattery fires reinforce division artillery. Division artillery delivers massed fires successively on defensive areas in the enemy position with priority to elements that most seriously threaten the success of the supported unit's attack.

#### 3304. COORDINATION

Coordination of fire plans is performed at all levels of artillery command. Plans are received from subordinate units of the force including the reserve element. A standard system of numbering targets simplifies identification.

a. Duplication of Fires.--Each target location should have only one target designation. Normally, targets will have the designation of the artillery unit in whose zone the target falls. In deciding which target number to retain, consideration is given to the problem involved in notifying units of the change.

b. Review of Coordination.--Subordinate unit fire plans should be checked against the parent unit's plan and any indicated changes made. If sufficient artillery is available and both force and other units have planned fires on a target, force artillery should fire these missions. Direct support artillery units are thereby released for additional missions supporting the infantry scheme of maneuver. Seldom is there sufficient artillery available to the infantry commander to reduce, destroy, or neutralize all the targets he desires to attack.

c. Artillery-Air-NGF Coordination.--Coordination is normally accomplished in the FSCC. Artillery fires are planned on targets that are suited to air and/or naval gunfire attack only after determination that air or naval gunfire support is not available for the target. Fire support coordination is covered in detail in FMFM 7-1, Fire Support Coordination.

d. Target Location.--In many cases, higher artillery echelons will have more accurate locations than those shown on the fire plans of subordinate commands. In these cases, the subordinate units are promptly notified and provided with the improved data.

e. Weather.--In cases where weather (and other factors) may deny air or naval gunfire support, consideration must be given to target duplication. In such cases, the original plan of fire support may include an alternate plan. The desired flexibility is facilitated by evolving both primary and alternate plans concurrently.

f. Target Analysis.--Target analysis is the examination of potential targets to determine their military importance, priority of attack, and capabilities of available weapons for such attack. Target analysis is discussed in chapter 2.

### 3305. FIRE PLANNING TERMINOLOGY

The artillery fire plan is a technical document portraying in overlay form supporting artillery fires as targets, series, and groups of targets. Marginal information is published on the overlay giving pertinent information to aid the recipient in understanding it. To facilitate fire planning, the following terms must be thoroughly understood:

a. Artillery Fires.--Artillery fires are classified on the basis of effect sought, degree of observation, and degree of prearrangement.

(1) Effect Sought.--Classified as neutralization, destruction, registration, harassing, interdiction, and illuminating.

(a) Neutralization Fire.--Fire of great intensity delivered to disrupt, restrict, or hamper enemy operations and to otherwise reduce his combat efficiency. The effectiveness of such fire depends upon the degree of surprise, the amount of fire delivered, and its concentration.

1 Surprise.--Fires delivered without prior warning have the added effect of surprise. If the enemy is unprepared, demoralization and casualty producing effects are greatly increased.



Weapon & Charge	Maximum Rate of Fire		
	First 10 Minutes	First 30 Minutes	Prolonged Fire *
105mm Howitzer			
Charge 1, 2, & 3	45 Rounds	90 Rounds	135 Rounds
Charge 4 & 5	42 Rounds	85 Rounds	125 Rounds
Charge 6 & 7	40 Rounds	80 Rounds	120 Rounds
155mm Howitzer			
Charge 1	34 Rounds	50 Rounds	60 Rounds
Charge 2 & 3	32 Rounds	48 Rounds	60 Rounds
Charge 4, 5, 6, & 7	30 Rounds	45 Rounds	60 Rounds
175mm Gun	5 Rounds	15 Rounds	30 Rounds
8-Inch Howitzer			
Charge 1	14 Rounds	22 Rounds	34 Rounds
Charge 2 & 3	12 Rounds	20 Rounds	32 Rounds
Charge 4, 5, 6, & 7	10 Rounds	18 Rounds	30 Rounds
4.2-Inch (107mm) Mortar			
Charge 41	48 Rounds (3 Mins)	100 Rounds (20 Mins)	60 Rounds

Weapon	Effective Fragmentation Area	
	Impact Burst Area	Radius of Large Fragments
105mm Howitzer	20 x 30 Meters	190 Meters
155mm Howitzer	30 x 50 Meters	390 Meters
175mm Gun	30 x 95 Meters	580 Meters
8-Inch Howitzer	30 x 80 Meters	520 Meters
4.2-Inch (107mm) Mortar	30 x 30 Meters	170 Meters

Weapon & Ammunition	Single-Round Armor Penetration		
	500 Meters	1,000 Meters	1,500 Meters
105mm Howitzer (HEAT)	10.2 Cm	10.2 Cm	10.2 Cm

Weapon & Ammunition	Single-Round Concrete Penetration		
	900 Meters	2,700 Meters	3,600 Meters
105mm Howitzer (HE, FzM78)	64 Cm	48 Cm	46 Cm
155mm Howitzer (HE, FzM78)	119 Cm	98 Cm	82 Cm
8-Inch Howitzer (HE, FzM78)	168 Cm	122 Cm	122 Cm

\* Per hour

Figure 24.--Weapon Capabilities.

2 Massing.--The more concentrated the fire, the more complete is its effect. Simultaneous fire from a group of weapons is far more effective than an equivalent number of rounds from a single weapon.

3 Amount of Fire.--There is no exact formula for determining the amount of fire on a target to secure neutralization. The type of target will influence judgment. Figure 24 provides guidance. (See also FM 6-40, Field Artillery Cannon Gunnery.)

(b) Destruction Fire.--Fire concentrated on a target which is to be damaged physically to such an extent that it is rendered useless. Because of their greater projectile effect, medium and heavy artillery weapons are best suited for this purpose. Destruction fire can be delivered by employing indirect, direct, or assault fire techniques.

(c) Registration Fire.--Fire on a point of known or assumed location, delivered for the purpose of obtaining corrections in order to improve the accuracy of subsequent fires.



(d) Harassing Fire.--Generally of less intensity than neutralization fire. It is designed to inflict losses, or by the threat of losses to disturb enemy troops, to curtail movement, and to lower morale. Examples of suitable targets are assembly areas, command posts, supply dumps, and transportation centers.

(e) Interdiction Fire.--Fire delivered at points or in areas to restrict or deny their use to the enemy. Examples of targets are trail and road junctions, bridges, narrow corridors, and defiles.

(f) Illuminating Fire.--Fire employed to illuminate areas of suspected enemy movement, to permit surveillance of fire, to harass the enemy, or to assist friendly patrols or attacking infantry units in maintaining proper direction in darkness.

(g) Miscellaneous Fires.--Fires which accomplish a particular purpose or provide a specific effect. These fires are based on standard techniques. Examples are:

- 1 Flushing fires.
- 2 Barrier fires.
- 3 Reconnaissance by fire.
- 4 Deception fires.
- 5 Survey by fire.

(2) Degree of Observation.--Artillery fire may be classified as observed or unobserved.

(a) Observed Fire.--Those fires which can be seen by ground or aerial observers. Observation of artillery fire allows for adjustment and corrections of fires and consequent increases in effectiveness.

(b) Unobserved Fire.--Fire on a target that cannot be seen. Effective unobserved fires require accurate target location and reliable registration corrections.

(3) Degree of Prearrangement.--Targets are taken under fire either as planned fires or targets of opportunity.

(a) Planned Fires.--Fires for which data is prepared in advance. Fires may be planned as to location and time of firing (scheduled fires), or they may be planned only as to location and fired on call. Planned fires shorten the time required to deliver fire and facilitate coordination with other arms. The amount of detail in which plans may be made depends on such factors as the enemy situation, accuracy of location of enemy installations, scheme of maneuver, and plans of supporting fires of other arms.

1 Scheduled fires are those delivered at a specific time during the operation of the supporting unit. The time is specified in terms of minutes before or after H-hour or on the accomplishment of a predetermined movement or task.

2 On call fires are those for which a need can be anticipated but which will be fired on request rather than at a specified time.

(b) Targets of Opportunity.--Targets that appear suddenly and are engaged without advance preparation of data. Effective attack of these targets requires:

1 Employment of adequate reconnaissance and intelligence agencies.

2 Direct exchange of information and intelligence between higher, lower, and adjacent units.

3 Employment of the weapon that can place rapid, effective fire on the target.

4 Sufficient ammunition on hand.

5 Rapid analysis of the target, prompt decision to fire and subsequent fire order.

6 Close and continuing coordination.

b. Target.--Consists of personnel, materiel, or terrain that warrants engagement by fire and may be marked for future reference.

c. Group of Targets.--Consists of two or more targets to be fired concurrently. Groups are indicated by a combination of letters and a number.

d. Series of Targets.--Indicated by code name and consists of a number of groups, or both groups and individual targets planned to support a maneuver phase.

e. Program of Targets.--A number of individual targets or groups, or both, planned on targets of similar nature and fired on a schedule, listed in an artillery fire plan table. (See app. J.) Countermortar and counter-battery programs are examples.

f. Final Protective Fire (FPF).--A prearranged barrier of fire to protect friendly troops and installations by impeding enemy movement across defensive lines or areas. Its normal use includes integration with the fires of other supporting arms, minefields, obstacles, and final protective fires of weapons of the supported unit.

g. Preparation.--Intense prearranged fires delivered immediately before and/or during an assault. It is designed to disrupt communications, disorganize the hostile defense, and assist the friendly forces in gaining fire superiority. It may be delivered by artillery in conjunction with air and naval gunfire in accordance with a time schedule. If it is continued after H-hour, the preparation must be readily adjustable to the progress of the attack. The commander of the highest echelon concerned decides if a preparation will be fired and, if so, when it will begin and how long it will continue. Principal targets for a preparation are hostile artillery, mortars, defensive areas, supply installations, and reserves.

h. Counterpreparation.--Intense prearranged fires delivered when an enemy attack is imminent. These fires are planned to disperse enemy formations; disorganize command, communication, and observation facilities; decrease the effectiveness of the enemy preparation; and to destroy the enemy's offensive spirit. Targets for a counterpreparation include forward assembly areas, artillery, mortars, and other supporting weapons, observation posts, command posts, and communication facilities.

i. List of Targets.--Originates with the forward observers and company commanders and is their recommendation to the battalion commander for artillery fires. In the FSCC, the artillery liaison officer reviews the list for coordination and integration at each level of command involved in the fire support plan.

j. Artillery Target List.--Produced as a part of the artillery fire plan and provides an accurate explanation of each target on the graphical overlay.

k. Supporting Fires.--Fires delivered while the supported troops are engaged in either the attack or the defense. These fires may be planned as to both time and place (scheduled fires), fired on request (on call fires), or they may be fired as targets of opportunity.

### 3306. PREPARATION OF THE ARTILLERY FIRE PLAN

The artillery fire plan is a part of the integrated fire support plan of the landing force that normally includes two or more of the major supporting arms (air, naval gunfire, and artillery). The nuclear portion of the fire plan may be a separate appendix of the fire support plan or it may be an appendix to the artillery annex. The fire plans of lower echelons are coordinated, consolidated, augmented, and integrated at each successive artillery echelon. Toxic chemical, nonnuclear, and nuclear fires are integrated within each fire plan (air, artillery, and naval gunfire) at the FSCC and FDC at each level of the landing force. Artillery fire planning channels are illustrated in figure 25.

a. Development Within the Division.--Artillery fire planning usually begins with the infantry company commander and the artillery forward observer who prepare and forward a list of targets to battalion FSCC. Here actual concurrent planning between the artillery FDC and infantry FSCC is initiated and continued at each successive echelon until approval of the overall fire support plan. The infantry battalions forward their plans to the infantry regiment where that FSCC effects the necessary coordination, and approves and forwards the consolidated regimental fire support plan to the division. At each level, the artillery S-3 works closely with the artillery liaison officers.

b. Development at Division and Force.--At division level, the FSC, in coordination with the G-3, determines requirements for artillery fire support. Artillery requirements, including nuclear and chemical fires, are forwarded to the artillery regimental FDC where they are integrated with the artillery fire plans for the infantry regiments to produce the complete artillery fire plan for the division. The division's artillery fire plan is disseminated to force artillery with requests for additional fires, as required. Division artillery fire plans are integrated and coordinated at force in generally the same manner as the division. Force



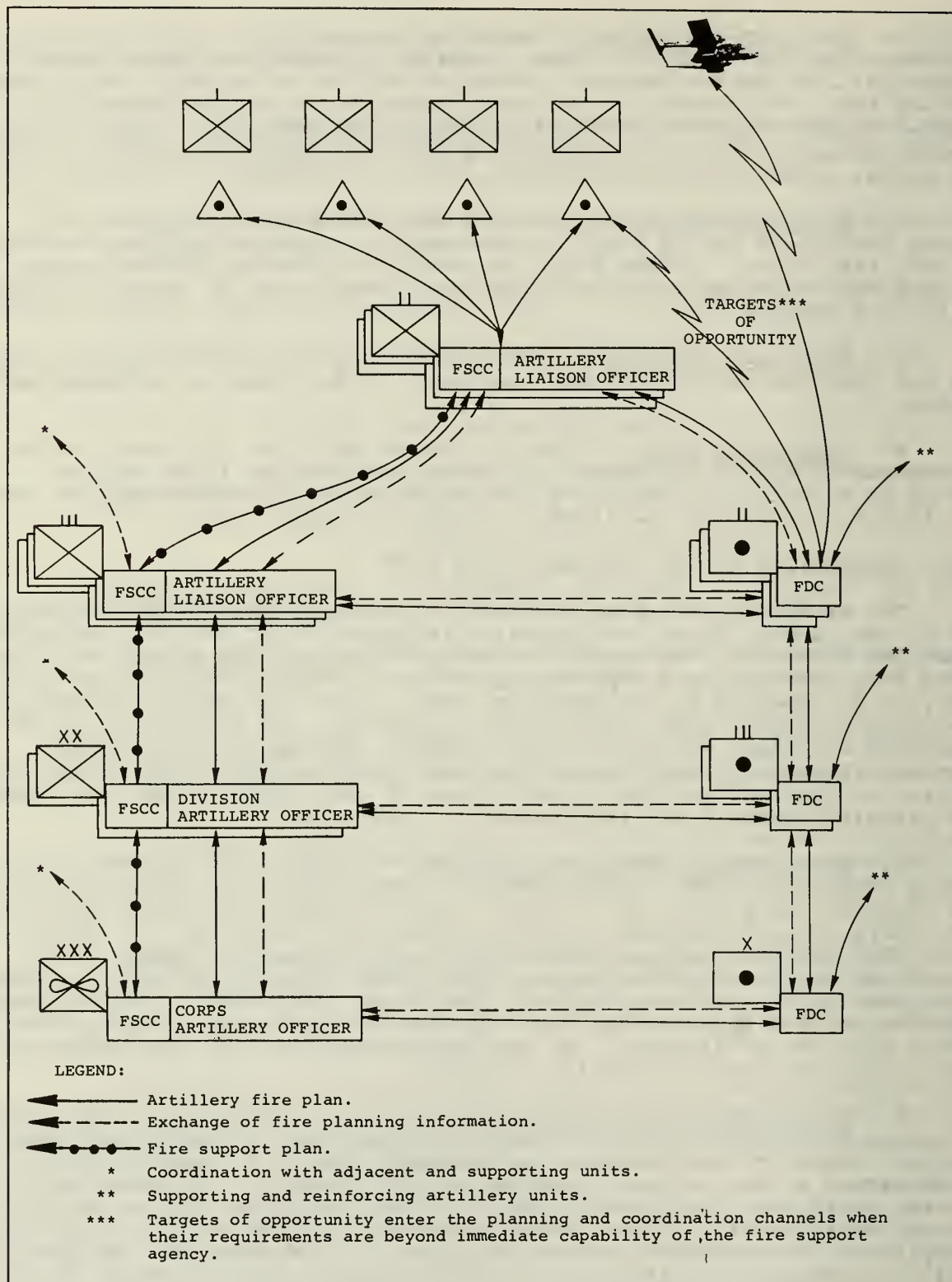


Figure 25.--Artillery Fire Planning Channels.



provides additional fires by placing requirements on force artillery units and adjacent artillery regiments. Force avoids diverting artillery supporting the attack of subordinate commands.

c. Planning Process.--The planning process consists of:

- (1) Collection of accurate target information.
- (2) Selection of targets best suited for attack by the available artillery.
- (3) Estimation of the artillery and ammunition needed to obtain the desired effect on target.
- (4) Preparation of a detailed plan for the employment of artillery against newly discovered, known, and on call targets.

d. Steps in Preparing the Plan.--Artillery fire plans are prepared by the operations personnel at each artillery echelon with instructions from the commander and higher artillery headquarters. The fire plan has five parts including a graphical portion showing the planned targets, a target list, marginal information which includes requests for additional fires, a fire plan table when appropriate, and a table of groups of targets when appropriate. In preparing the artillery fire plan, the following steps represent an orderly means of accomplishing this task:

(1) The concept of the operation, priorities for support, and organization for combat are announced by the supported commander.

(2) The special requirements of both the force and supported unit commanders are obtained from fire support coordinators or liaison officers.

(3) A list of known targets is compiled by the artillery S-3 and S-2. A list of suspect targets is compiled by the S-2, using all available sources. The known and suspect targets are combined in a general list of targets for fire planning.

(4) Normally, artillery will be planned on all targets within its capability. Air and naval gunfire will be planned on targets that are not subject to effective attack by artillery.

(5) Fires are planned to cover known and suspect targets and critical areas within the zone of operation.

(6) Artillery operations and intelligence personnel determine the best method of attack.

(7) To the extent possible, fires are planned as requested by lower echelons. However, the requirements of higher echelons are accepted as they are received and included in the plan.

(8) Higher artillery echelons supplement the fires of lower echelons.

(9) Lower echelons request the next higher artillery echelon to plan fires on targets beyond the capabilities of organic weapons.

(10) Higher echelons may direct lower artillery echelons to plan fires on targets critical to the force as a whole.

(11) Fire plans of lower echelons are coordinated to conform with instructions of the force commander.

(12) Groups, series, and programs of targets are prepared by the appropriate artillery echelon as required to support the plan of maneuver.

(13) In scheduling fires, the capabilities of each unit are determined in terms of the targets it can attack.

(14) Throughout the preparation of artillery fire plans, coordination is required with supported units, other supporting arms, and higher, lower, and adjacent artillery echelons.

e. Battery Fire Planning.--The battery liaison officer performs artillery fire planning for the infantry battalion, under the supervision of the S-3.

(1) The supporting battery commander and/or his liaison officer with the infantry battalion S-3 coordinates the lists of targets submitted by forward observers and company commanders. They determine the locations of the targets to be attacked and, where appropriate, the time of attack and the volume and type of fire to deliver on each target.

(2) When requirements for artillery support beyond the capabilities of the battery exist, the parent artillery FDC is requested to provide the additional fires. This request may require change in the organization for combat in the event reinforcement or attachment of additional artillery is dictated.

(3) With the aid of his fire direction officer, the battery commander prepares his plan in graphic form, usually as an overlay to the firing chart in use. He ensures that it is fully coordinated with the plans of other fire support means and submits it to the infantry battalion commander for approval.

(4) When the battery is operating as an organic or attached unit of the artillery, battery fire planning must be coordinated at the higher level FDC. Additional fires are approved and target numbers resolved by the parent FDC.

f. Battalion Fire Planning.--Fires of batteries/battalions in general support are normally planned by the FDC of the artillery headquarters to which they are attached or assigned. The direct support artillery battalion commander, S-3, and liaison officer prepare the artillery fire plan for the supported infantry regiment.

(1) The artillery battalion commander and/or his liaison officer with the infantry regimental commander and/or S-3 determine the targets to be included in the artillery fire plan at the regimental FSCC. The approval of component battalion lists of targets and fire support plans are made at the FSCC. Air and naval gunfire planning are coordinated with the artillery planning at the infantry regimental FSCC.

(2) The artillery battalion commander, assisted by his S-3, examines and consolidates the fire plans received from battery commanders, provides for additional fires, resolves conflicts and target numbers, and finally, incorporates them into the artillery fire plan for the infantry regiment. The targets provided by the artillery battalion are developed from the requirements of the supported infantry headquarters, the senior artillery headquarters, and from the battalion FDC (S-2 and S-3 sections).

(3) The artillery fire plan is composed and issued in as complete a form as the time for planning and coordination permits. Reinforcing artillery units' fires are planned by the reinforced battalion. General support-reinforcing units' fires are planned by the reinforced battalion. General support-reinforcing units' fires are planned only if directed by higher headquarters. The distribution of the completed artillery fire plan is made to the supported units and the involved artillery units as rapidly as possible. If time permits, a complete plan is disseminated; however, concurrent planning may require modification that can be transmitted electronically or by other means.

g. Group Fire Planning.--The field artillery group, battalion-group, and battery-group plan fires in the same manner as artillery battalions.

h. Regimental Fire Planning.--The artillery regiment's fire planning objective is the coordination of artillery fire support of the division. Depending on the situation, fire planning may vary from the checking of direct support battalion fire plans in a rapidly moving situation to the preparation of the complete and higher detailed plans required in the attack of a fortified position. When the landing operation is characterized by widely separated units, the artillery regiment will be primarily concerned with development of fire plans for deep support, counterbattery, and ground delivered nuclear fire support. These plans (as well as the allocation of fires to reinforce direct support units) are based on the division commander's overall concept. The process is the same as that at battalion level.

i. Force Artillery Fire Planning.--Force artillery maintains liaison and communications with each artillery regiment within the force to ensure prompt action on fire requests and coordination of fires of mutual interest. Additionally, communications and liaison are maintained laterally between the force and adjacent commands.

(1) Preparation of the detailed fire plan begins with planned fires in the zone of action on hostile artillery locations, targets beyond the range of division artillery, and targets of importance to the corps as a whole.

(2) Artillery fires requested by lower echelons are included.

(3) The plan is modified to meet changes in the situation as they occur.

(4) Coordination with lower echelons is made if fires are planned within the zone of fire of the subordinate artillery commands or if their operations are affected.

(5) Coordination of the plan with the fire plans of air and naval gunfire is made in the FSCC by the artillery commander (officer).



Nuclear artillery missions are planned, requests approved, and fires integrated with those of air and naval gunfire as necessary.

j. Planning Offensive Fires.--Fire support in offensive action is covered in greater detail in chapter 5, section II. Artillery fire support in the offensive is divided into three phases:

- (1) Fires prior to the preparation.
- (2) The preparation.
- (3) Fires in support of the attack.

k. Planning Defensive Fires.--Artillery must be prepared to support all phases of the defense and all echelons of the ground security force. The fire support mission of the artillery is executed in the same manner as in the offense. Fire support planning in the defense is covered in detail in chapter 5, section III. For planning purposes, defensive artillery fires are divided into the following categories:

- (1) Fires delivered before the attack.
- (2) Counterpreparation.
- (3) Fires during the enemy attack.
- (4) Fires in support of the counterattack.

l. Flak Suppression Fires.--Flak suppression fires are fires requested by a troop or air commander for the specific purpose of protecting aircraft from ground fire during the execution of close air support missions. These fires are of particular importance during the landing and assault phases of an amphibious operation.

m. Counterfire Plans.--In addition to flak suppression plans, counterbattery and countermortar plans are prepared by the artillery S-3 to neutralize hostile artillery. These plans are prepared in the same manner as the preparation. The S-2 and S-3 work together in the preparation of these plans. Counterbattery and countermortar activities are covered in detail in chapter 2, section V.

n. Miscellaneous.--Fire plans are prepared for any foreseeable eventuality and implemented on order. These plans are prepared to counteract a wide scope of tactical possibilities. The commander, with the advice of the artillery commander, directs the preparation of these fire plans. They are designed to complement the scheme of maneuver (or defense) of the supported unit; they are generally defensive in nature. Some of these plans are:

- (1) Antimechanized fire plans.
- (2) Antiguerilla fire plans.
- (3) Illumination fire plans.
- (4) Deception fire plans.
- (5) Barrier fire plans.



## 3307. TARGET DESIGNATION SYSTEM

a. Target Numbering System.--A target numbering system must provide for the following requirements: identification of planning source, preclusion of duplication, compatibility with computers, distinctive identification of special weapon, and counterbattery targets, and be compatible with security requirements. Targets are designated by two elements consisting of two letters and four numbers. The two-letter group identifies the planning source and the four-digit numerical group further designates each specific target as a separate entity.

b. Target Number Allocation.--The artillery headquarters of the landing force is responsible for designation. This headquarters will provide the required guidance and correlation of the target designation system to be used. Adequate amounts of numbers preclude duplication. Target numbers may be reused when a target is no longer of value; however, a method of cancellation is instituted to prevent identification problems. Dissemination of cancellations, changes, and modifications are normally the responsibility of the senior artillery FDC involved. The fire support coordinator in the infantry FSCC allocates target numbers to air and naval gunfire representatives. Modifications to the target designation system should be confined to use within the headquarters making the modification. Such modifications should not be reflected in target information transmitted from one headquarters to another. For details of target designation, see FMFM 7-1, Fire Support Coordination.

## Section IV. TRAINING

## 3401. GENERAL

The S-3 of the artillery unit has staff responsibility for the planning and supervision of the overall training program within the unit. He is directly responsible for the gunnery training of the unit and particularly of the fire direction center (FDC). The training syllabus of the artillery unit includes technical training in the artilleryman's specialty. Formal classroom instruction combined with field training provides the opportunity to put theory into actual practice. The field work includes service practices, firing and nonfiring field exercises, and participation in amphibious training exercises. The care and maintenance of equipment must be stressed, particularly in the prevention of salt water damage. Supervision at every level is necessary for a successful training program. See appropriate Marine Corps directives and manuals.



## CHAPTER 4

### LOGISTICS

#### Section I. GENERAL

#### 4101. INTRODUCTION

The principles and techniques of the logistic system are covered in detail in FMFM 4-1, Logistics and Personnel Support, from the planning phase to the termination of the operation. This chapter emphasizes the relationship of artillery to the logistic system. Ammunition and motor transport pose significant logistic problems to the artillery commander in the accomplishment of his tactical mission and are covered in detail.

#### 4102. LOGISTIC DUTIES IN ARTILLERY UNITS

For a detailed discussion of the duties of the S-4, see FMFM 3-1, Command and Staff Action.

a. Staff Cognizance.--In the detailed execution of the management functions of logistics, the S-4 is assisted by various special staff officers. Some of the officers over whom he exercises staff cognizance in artillery units are:

- (1) Supply officer.
- (2) Ordnance officer.
- (3) Ammunition officer.
- (4) Motor transport officer.
- (5) Mess officer.

(6) Surgeon.

(7) Embarkation officer. (See chap. 7.)

b. Staff Organization.--The table of organization normally provides the minimum personnel to assist the S-4 in the execution of the logistic duties. Enlisted chiefs of section, technicians, and administrative personnel are provided in sufficient quantity to operate an efficient logistic system. The S-4 and the permanent officer members of the logistic section will normally perform the duties of some special staff billets and will recommend the assignment of the best qualified officers in the others.

c. Regimental, Corps, and Force Artillery S-4.--The artillery S-4 above battalion level has specific duties to perform. Some of these duties are to:

(1) Ammunition Plan.--Prepare and supervise the execution of a plan for the timely supply of artillery ammunition. Ammunition data and recommendations regarding ammunition requirements and supply are assembled by each higher headquarters for evaluation and incorporation into the ammunition supply plan. The available supply of ammunition, road net, hours established for drawing and hauling ammunition, expected expenditures, proposed operations, available transportation, and location of supply points are all considered in developing and executing an ammunition supply plan. The landing force artillery S-4 coordinates closely with the landing force ordnance officer to ensure timely procurement and continuous distribution of ammunition for all artillery with the landing force. (See fig. 26.)

(2) Status of Ammunition.--Coordinate with the S-3 in keeping the commander informed of the status of ammunition within the command. Commanders are concerned not only with the availability of ammunition as determined by higher headquarters but also with the status of ammunition within their commands. In order not to exceed prescribed allowances, commanders must allocate ammunition by type of weapon and by the relative importance of artillery fire in specific areas. The status of ammunition affects the duration of artillery preparations, the amount of artillery fires that are massed, and the type and number of rounds fired on specific targets.

(3) Recording Information.--Keep appropriate records of the overall ammunition status, location of ammunition supply points, and available transportation. Ammunition section personnel frequently must obtain from higher headquarters the location of division and corps class V supply points. By maintaining records of such locations, S-4's at higher headquarters eliminate problems and save time for subordinate units. When appropriate, these locations are given in administrative/logistics plans. In other situations, such as one in which supply points or ammunition dumps are moved fairly often, information is furnished from the situation map maintained by the S-4. In all cases, whether or not an administrative/logistics plan is distributed, location of supply installations is kept on logistic situation maps.

(4) Status of Transportation.--Know the status of transportation within the command. Artillery units are often required to provide trucks for both tactical and administrative movements of artillery troops, equipment, and materiel. Although the tactical movement of troops in a



TYPE OF CLASS V PALLETIZATION	DESCRIPTION OF PALLET	SIZE OF PALLET	CUBIC CAPACITY	BASE WEIGHT (POUNDS)	AVERAGE LOADED WEIGHT	AVERAGE CUBIC FEET
Steel Pallets (For all class V except 155mm and larger)	Small	35 inches x 45 inches	36 feet	55	2,000 pounds	39
	Medium	40 inches x 48 inches	39 feet	72	2,000 pounds	39
	Large	48 inches x 48 inches	43 feet	91	2,000 pounds	39
Wooden Pallets and Skids (For 155mm and larger class V)	155mm Howitzer	8 rounds/skid			814 pounds	6.34
	155mm Howitzer	8 rounds/skid			802 pounds	6.54
	175mm Gun	6 rounds/skid			948 pounds	10.6
	8-Inch Howitzer	3 rounds/skid			633 pounds	6.01

SITUATION INVOLVING CLASS V HANDLING	UNCONDITIONED TROOPS	CONDITIONED TROOPS
Normal	6 Tons per Man per Day w/4-Hour Shifts	16 Tons per Man per Day w/Six-Hour Shifts
Expedite	8 Tons per Man per Day w/6-Hour Shifts	
Arctic Areas	Reduction up to 50%	Reduction up to 50%
Tropics	Reduction up to 30%	Reduction up to 30%

TYPE AMMUNITION	CAPACITY OVER SMOOTH, HARD-SURFACED ROADS	CAPACITY OVER CROSS-COUNTRY OR SECONDARY ROADS	CAPACITY FOR MOBILE LOADS
Cargo Trucks	100% Over Rated Capacity	Rated Capacity Only	Rated Capacity Only
Military Trailers	Rated Capacity Only	Rated Capacity Only	Rated Capacity Only

Figure 26.--Planning Considerations for Movement of Ammunition.

combat unit is a responsibility of the S-3, the S-4 assists in planning such a movement. To avoid the probability of overloading some units and to assign vehicles equitably, the S-4 maintains up-to-date data which reflects the current status of transportation within the organization.

(5) Coordination of Transportation.--Keep a current record of all traffic data and information on road nets. The tremendous amount of supplies, particularly the weight and bulk of artillery ammunition, creates a cumbersome logistic problem. This problem of moving supplies requires coordination of the highest level. After coordination with the force headquarters, corps (force) artillery and the artillery regiment coordinate closely the allocation of road space to subordinate units. The S-4's of these headquarters prepare traffic schedules and routes for units to draw supplies. Generally, priorities are established for units during displacement or when the main supply route (MSR) is congested. The S-3 prepares march graphs which show graphically the location of units at any given time during a march. These graphs enable higher headquarters to establish priorities for units, depending on the rate of march, time length of the column, distance to be covered, and tactical advantages expected (in cases of displacement). The S-4 furnishes the S-3 traffic data and transportation availability for these movements.

(6) Supervision of Logistics.--Supervise and coordinate all logistic functions of the command to ensure adequate support. As an

advisor, planner, coordinator, and supervisor, the S-4 must make frequent contact with subordinate units' S-4's to assist them with procurement problems and to ensure proper distribution of supplies of tactical significance. The S-4 maintains records of major items of equipment which, if in short supply or turned in for repair, would affect tactical operations. Recording other information, such as the available supply of class III items, may be necessary on occasion. However, the expenditure of these items, unlike ammunition, is significant for statistical reasons only. The S-4 should recommend to the S-4 or G-4 in the next higher echelon the movement of supply points farther forward when timely resupply to his unit is difficult.

(7) Logistics Planning.--Amplifies administrative/logistics orders, when appropriate, and maintains logistic situation maps. (See fig. 27.) The S-4 will not always publish an administrative/logistics order, but he may instead recommend to the G-4 the inclusion of information required by artillery units in the division, corps, or landing force administrative/logistics order.

d. Artillery Battalion S-4.--The S-4 at the artillery battalion level will normally prepare administrative/logistics orders only in the planning phase of an amphibious operation or when required by the commander. In most combat situations, the S-4 will provide information to the S-3 for inclusion in paragraph 4 of the battalion operation orders or prepare an administrative/logistics annex if the information is voluminous. The duties of the S-4, peculiar to artillery units, are related to the ammunition plan. He plans ammunition supply based on estimated requirements received from the S-3, and supervises the distribution of ammunition. Prior to drawing ammunition, the S-4 considers the amount of ammunition on hand, expected expenditures, and the available supply rate. Normally, he obtains this information, except the available supply rate, from the S-3.

#### 4103. MOTOR TRANSPORT

Motor transport provides the mobility that is necessary to effective artillery support. It provides the means for movement of guns, personnel, supplies, and ammunition. The S-4 exercises staff cognizance over motor transport through the unit motor transport officer. He assists the motor transport officer in procurement of accessories, spare parts, by providing operational guidance, and in procurement of technical assistance and maintenance from division service elements. The unit motor transport officer exercises direct supervision over the motor transport activities in accordance with the desires of the commander and guidance of the S-4. He is responsible for training drivers and mechanics, operation of the motor pool, and maintenance of motor vehicles within the unit's echelon of maintenance. For additional discussion refer to USMC TM-11240-15/1B, Tactical Motor Transport Vehicles Preventive Maintenance; FMFM 4-1, Logistics and Personnel Support; and MCO 11240.

#### 4104. LOGISTIC PLANNING DOCUMENTS

The artillery unit S-4 prepares formal documents only when time permits. During tactical operations, abbreviated logistic estimates may be written or orally presented, and administrative/logistics orders are provided as fragmentary, overlay, or by oral presentation. Nevertheless, the basic concepts are utilized and the most important facts are covered in the

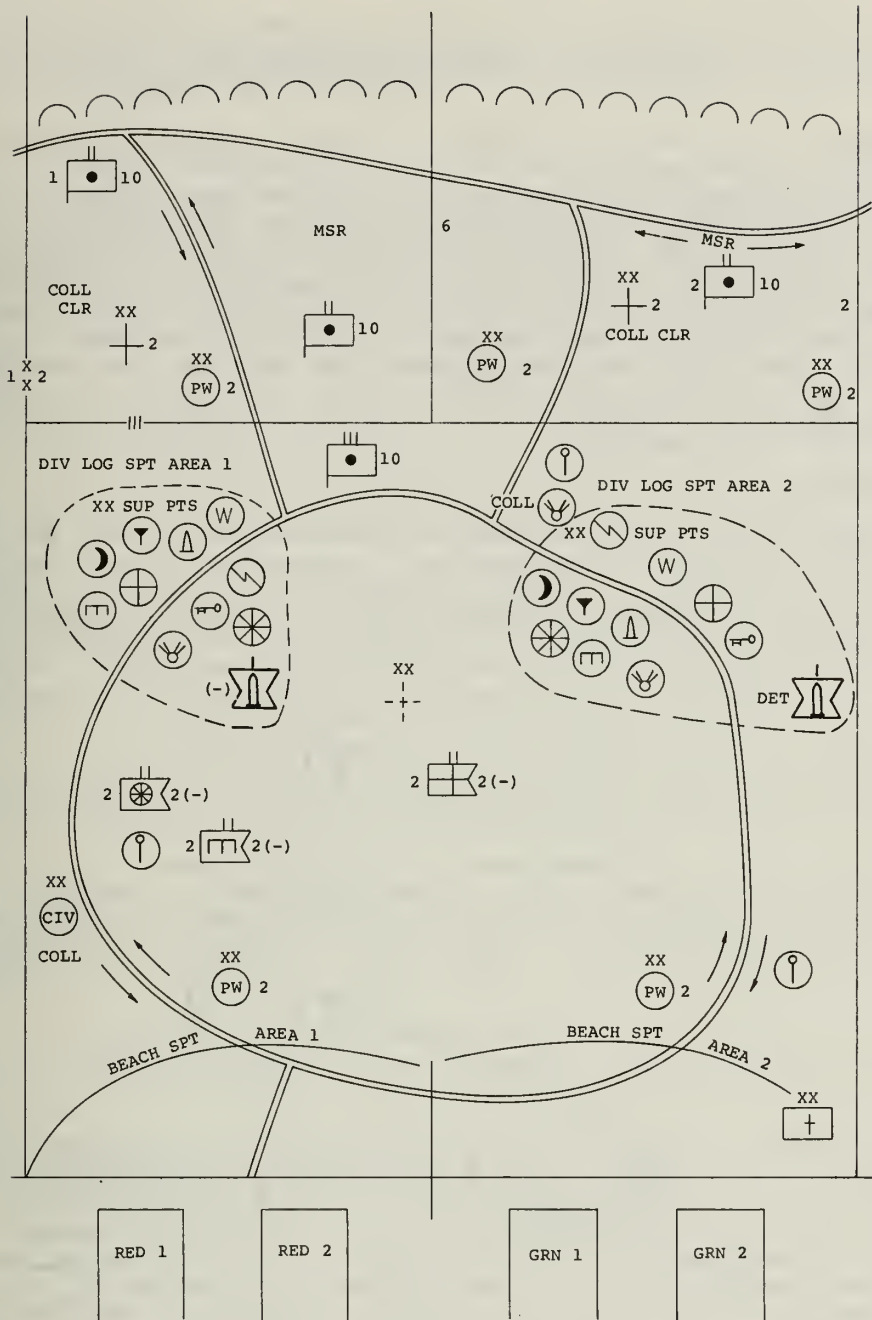


Figure 27.--S-4 Situation Map.

detail necessary to accomplish the mission. The S-4 is responsible for preparing the logistic estimate, administrative/logistics orders and annexes, and maintaining the logistic situation map and overlays. (See FMFM 4-1, Logistics and Personnel Support.)

## Section II. AMMUNITION SUPPLY

## 4201. GENERAL

This section deals with ammunition (class V(W)) supply. It is designed to provide guidance for commanders and key personnel who are concerned with the management, supply, and maintenance of conventional and special ammunition. The efficiency and responsiveness of the ammunition supply system is measured by its ability to place the required amount and type of serviceable ammunition with using units when needed. (See fig. 28.) The methods and means described herein outline the basic principles and procedures. For more detailed information see MCO 8010.1\_ and FMFM 4-1, Logistics and Personnel Support.

## 4202. TERMINOLOGY

a. Class V(W) (CL-V).--Refers to munitions containing an explosive and/or chemical, nuclear, or radiological element which is propelled, placed, thrown, or dropped to inflict damage upon structures, personnel, materiel, or other military objectives. The term includes nuclear weapons,

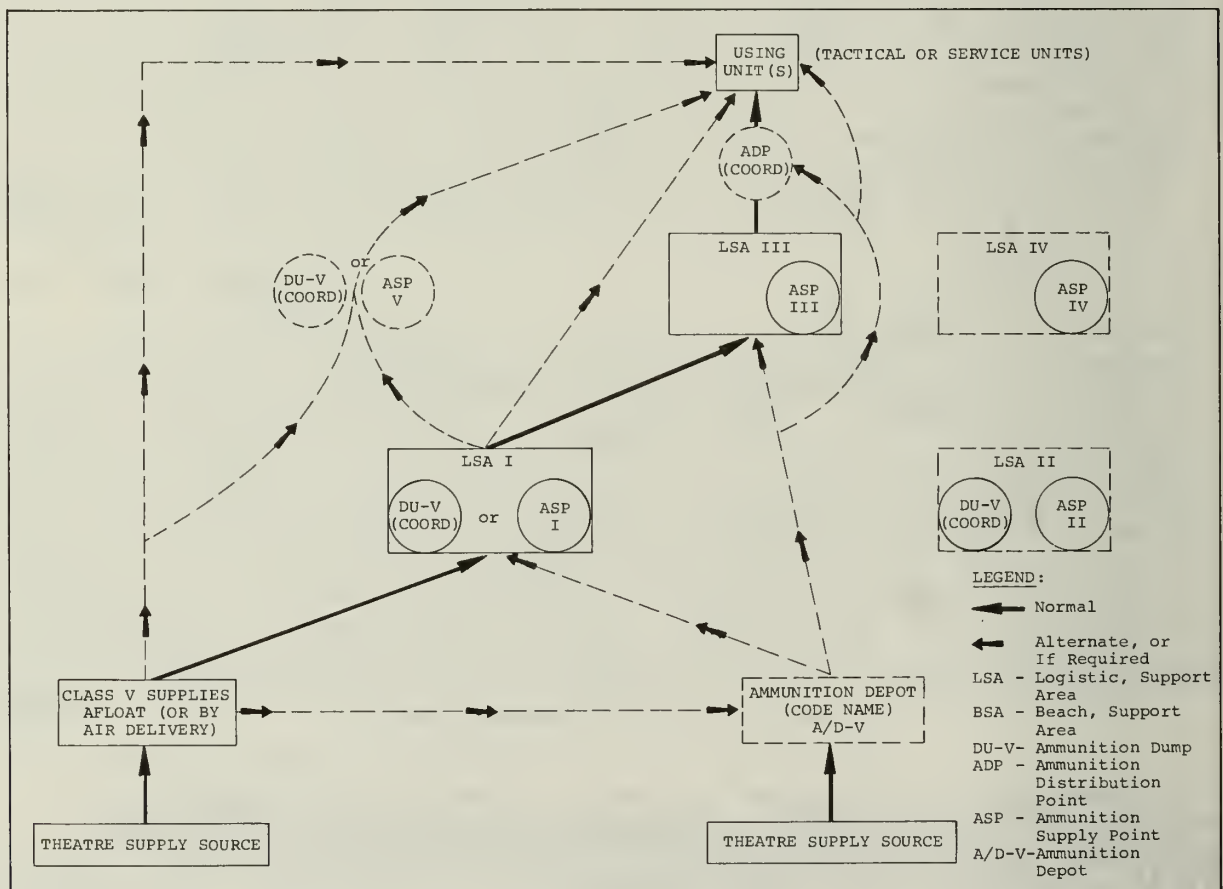


Figure 28.--Flow of Class V(W) Supplies.



complete missiles, heavy rockets, and nuclear ordnance items as well as inert loaded conventional ammunition. The term excludes nonexplosive repair parts for missiles and rockets.

b. Basic Allowance (BA-V).--A specific quantity of ammunition per ammunition consuming item (weapons, kits, etc.) required to provide an initial distribution to Fleet Marine Force units preparing to enter combat. Generally, the quantities representing a basic allowance are intended to reflect that quantity of class V(W) supply which can be handled or carried within the means normally expected to be available to a given Fleet Marine Force unit embarking for combat operations. The FMF commander may make adjustments to the basic allowance to accommodate specific and unusual missions as well as the mode of transport to the objective area.

c. Day of Ammunition (DOA).--A unit of measurement expressed as a specified number of rounds; or "items" of bulk ammunition; per weapon, unit, kit, set, or using device required for one day of combat. Normally, the DOA or DOA's is used to reflect the total force requirement for one or more days. For additional information and computation of DOA planning factors, see MCO 8010.1\_.

d. Prescribed Load (PL-V).--Specified quantities and types of class V(W) supply prescribed by the commander for the support of designated subordinate units. The prescribed load is not a fixed quantity and may change from day-to-day or operation-to-operation at the discretion of the commander.

(1) Subordinate commanders are responsible to maintain the prescribed load on hand at all times, allowing for fluctuation above and below the prescribed quantity due to the tactical and logistic situation.

(2) The composition of a prescribed load for a unit may be expressed in terms of the basic allowance, plus or minus a designated number of types or rounds; it may also be expressed in days of ammunition or by a specific number of rounds or items by type. Normally, the prescribed load will be the BA-V.

(3) A primary factor in determining the prescribed load is the amount of supplies which can be carried by individuals or in assigned transportation.

e. Required Supply Rate (RSR-V).--The amount of ammunition required to initiate and sustain operations of any designated force without restriction for a specified period. The RSR-V is expressed in terms of DOA. Tactical commanders use RSR-V to state their requirements for support of planned tactical operations. It is submitted through command channels and is used by the commander to determine the available supply rate for his command. Subsequent to receipt and consolidation of all estimates for a given period of operation, the commander compares the results with his available stocks of class V(W) and prevailing resupply conditions. This enables him to determine the maximum expenditure rate he can support for a given situation or time.

f. Available Supply Rate (ASR-V).--The rate of consumption that can be sustained with available supplies for a given period. The ASR-V is announced or determined by each commander and is applicable within this command. The rate is expressed in terms of DOA.

g. Ammunition Supply Point (ASP).--An activity established by logistic support agencies organic to the landing force for receipt, storage, assembly, accounting, issue and/or distribution, and limited salvage of class V(W) supplies.

h. Ammunition Dump (DU-V).--Temporary class V(W) supply sites established for storage of munitions. An ammunition dump will always be identified by geographical coordinates. This type activity is primarily used for temporary storage in amphibious operations during the buildup of prescribed supply levels ashore, pending establishment of normal class V(W) support operations. Dumps may also be established inland as an emergency supply source, or for initial support of helicopter operations. When prescribed levels ashore have been attained, and on order of appropriate authority, dumps may become ammunition supply points for using units. Conversely, when an ASP is closed (no issues to using units), it becomes, on order, an ammunition dump.

i. Ammunition Distribution Point (ADP).--A point which class V(W) supplies are distributed directly to using units. These points usually carry no stocks as the items on hand are usually drawn from ASP's for immediate issue to meet periodic, or daily needs, of using units. However, the physical location of ADP's may have a relative degree of performance depending on the tactical situation of the unit which it supports. They are identified by geographical coordinates.

j. Department of Defense Ammunition Code (DODAC).--A code developed by the Office of the Secretary of Defense and the military departments to provide uniform, centrally assigned code numbers for generic descriptions applicable to items of supply identified under the Federal Catalog System in Federal Supply Classification Group 13 (Ammunition and Explosives), and Group 14 (Guided Missiles). The DOD ammunition code number is an eight-character semisignificant number divided into two parts separated by a hyphen. The first part consists of four numerals; e.g., 1320, which forms the Federal Supply Classification code number assigned to the items covered by the generic description. The second part consists of one letter and three numerals or two letters and two numerals assigned to a generic description within the FSC class; e.g., D548, assigned to projectile, 155mm; smoke, HC, f/howitzer.

k. Ammunition Lot Number.--A number assigned to every component of conventional ammunition at the time of manufacture and to each complete round or fixed and semifixed ammunition at time of assembly. This number identifies the condition under which the round was assembled and the components used in the assembly. It is marked on each component/round (except where the items are too small) and on all packing containers. It is required for all purposes of record, including reports on condition, functioning, and accidents in which ammunition is involved.

#### 4203. SUPPORTING ORGANIZATIONS

The following organizations have primary responsibility to provide class V(W) support for the Fleet Marine Force:

a. Ammunition Company, Supply Battalion, Force Service Support Group.--The mission of the ammunition company with respect to class V(W) involves the establishing of ammunition dumps and operating supply points for class V(W) supply. It is also organized to provide V(W) support required during the embarkation phase, and during the initial stages of an amphibious attack.



b. Force Service Support Group (FSSG)

(1) Mission.--The mission of the supply battalion, FSSG, includes the supply of class V(W) to all elements of the landing force. This mission includes support during the embarkation phase, the assault, and followup echelon. FSSG would control the flow and distribution of class V(W) from rear ammunition dumps to forward ASP's and laterally, if required.

(2) Special Logistic Capabilities.--FSSG or detachments therefrom, has the capability of providing all required support incident to availability, readiness, and employment of nuclear and chemical weapons. Supply battalion supplies all special types of class V and provides detachments for technical assistance to user units; e.g., the nuclear ordnance platoon (NOP). Nuclear and chemical weapons require special consideration in combat operations, especially with respect to safety, security, transportation, and handling. The supply support involving nuclear and chemical weapons is unique, in that it incorporates nuclear and chemical class II and class IV items into the class V(W) support system. Supply battalion performs all functions incident to the receipt, storage, issue, and field maintenance for class II and IV nuclear, chemical, and biological defense materiel. Detachments of FSSG may be attached to the division to provide combat supply and maintenance support to include requisitioning, accounting, limited storage, and issue for nuclear and chemical materiel and munitions. The landing forces shore party is most likely to use these detachments to provide support on the beach prior to the landing of FSSG.

4204. CONCEPT OF CLASS V LOGISTIC SUPPORT

Unless otherwise specified, terms, planning factors, and procedures are applicable to both command and supply echelons. A properly functioning class V(W) support system demands that supplies of required types and quantities be available at the proper time and location to support initial operations as well as succeeding operations which are conducted to exploit successes. For each operation, a continuous estimate of the logistic situation, in conjunction with the tactical situation, indicates prescribed loads and levels of supplies to be maintained.

a. Planning Phase.--During the planning phase for operations, class V(W) requirements are determined; then they are analyzed to ascertain whether or not they can be supported; and finally, ASR's, if necessary, and prescribed loads are established.

(1) Class V(W) requirements are the anticipated ammunition expenditure and estimated resupply requirements and they are determined on the basis of the following factors:

- (a) Mission.
- (b) Enemy situation.
- (c) Size and composition of friendly forces.
- (d) General tactical plan.
- (e) Estimated duration of the operation.

(2) The ability to support the ammunition requirements is determined based on the following factors:

- (a) Availability of ammunition in the theater.
- (b) Transportation means available.
- (c) Time available.

b. Operational Support Phase.--Certain quantities of mobilization reserve class V(W) stocks are earmarked and positioned for designated Fleet Marine Force units in accordance with current logistic readiness projects (CLOUD/STORM). These stocks are a ready source of class V(W) supplies to meet requirements of commanders ordered to conduct an operation either in conjunction with these projects or by other specific initiating directives.

(1) Mounting-Out.--Basic allowances of class V(W) stored with or near FMF units will be issued directly to embarking units prior to loading. The responsibility for withdrawing, issuing, and segregating into ships' loads for loading of basic allowance is with the respective unit commanders, as is the case of prescribed loads of other classes of supply. Service battalion may provide technical and supervisory assistance. Actual loading will be accomplished under the direction of the embarkation team commander. This quantity of ammunition plus any additional that may be provided in accordance with administrative/logistics plans will normally constitute the prescribed load of class V(W) for landing.

(2) Replenishment.--Landing force supplies of class V(W), with which to replenish prescribed loads of artillery units and maintain prescribed levels of supply until increments of resupply arrive in the objective area, are withdrawn from designated supply activities external to the landing force and are combat loaded in assigned assault shipping. Based on previous planning, specified quantities of landing force class V(W) supplies will be so loaded and designated as to constitute floating dumps, and to provide a source of selective discharge of class V(W) supply in direct support or for emergency supply of assault units.

(3) Maintenance of Prescribed Loads.--During the initial stages of the amphibious assault, artillery units will maintain their prescribed loads from floating dumps, or from landing force supplies which are loaded for selective discharge. These sources should sustain the artillery with the landing force until the supply system is functioning ashore.

c. Assault Loading.--Assault units will be landed with their prescribed loads of class V(W) divided among individuals, gun sections, and organic or assigned transportation. Emergency delivery of class V(W) support to assault units is provided from floating dumps. Landing force supplies of class V(W) will be issued to using units as required to replace or maintain prescribed loads.

d. Operations Ashore.--Once assault elements are in control of the landing area and prescribed levels of supply are reached, landing force supply operations may begin functioning.

(1) Elements of the FSSG establish and maintain class V(W) support for the operation. Ammunition dumps and supply points (DU and ASP)



will be established in the logistic areas or landing zones as quickly as conditions permit. Ammunition distribution points (ADP) may be established as dictated by the situation. As operations progress, additional ASP's will be established inland.

(2) Replenishment of ammunition to using artillery units will be concurrent with expenditures or in anticipation of immediate requirements. Expenditure control is effected through a system of rationing, utilizing available supply rates and restrictions on firing. Normally, combat units will be required to report only the ammunition on hand, deficient to or in excess of prescribed loads, and any anticipated heavy expenditures. Removal of ammunition from supply points by the using artillery units provides the necessary information on ammunition expenditures, since ammunition is considered as being expended when issued. Requisition procedures are kept simple and as direct as possible. (See fig. 29.)

#### 4205. OPERATING PROCEDURES

Supply control is based on the announced policies of the commander. Artillery commanders must ensure that their units are fully supported by making appropriate estimates of ammunition requirements and recommendations as to loading, landing, and issuing of artillery ammunition. The control policies of the commander landing force must ensure that using units are supplied with the quantities and types of class V(W) items necessary to sustain their occupations. To this end, all artillery commanders must have timely and accurate knowledge as to total available quantities and types of class V(W) in the area of operations and the location of storage sites. The artillery S-4 must keep the artillery commander and S-3 fully informed of any changes to the ammunition status of the unit and landing force.

a. Command Responsibilities.--All artillery commanders have certain responsibilities in regard to the ammunition supply system to ensure its proper functioning and to facilitate tactical operations. Some of these are:

(1) Evaluation of required supply rates submitted by subordinate commands and submission of consolidated required supply rates to higher echelons. Required supply rates are normally submitted on request, or when it is indicated that requirements for a specific period will be excessive.

(2) Establishment of available supply rates as required and announcement of established rates to subordinate units.

(3) Recommending prescribed loads for using units and levels of supply for supporting units to the next higher headquarters.

(4) Maintaining of prescribed loads and levels of supply as directed by higher headquarters.

(5) Enforcement of supply economy.

(6) Ensuring availability of technically qualified officer and enlisted personnel at various command levels to assist in the planning and operation of class V(W) support operations.

b. Responsibilities of the Artillery S-4.--Ammunition planning is performed utilizing class V(W) planning factors (see MCO 8010.1\_) modified

STANDARD AMMUNITION REPORT FORM				
TYPE REPORT (Check One)		DATE: <u>APRIL -</u>		
<u>          </u> ALLOCATION		TIME: <u>0800</u>		
<u>✓</u> REQUISITION		PERIOD COVERED: FROM: <u>NA</u> (Date/Time)		
<u>          </u> STOCK STATUS		TO: <u>NA</u> (If Applicable)		
OTHER: (Specify)				
FROM: <u>C BTRY 1ST BN, 11TH MARINES</u> (Reporting Unit) (Requesting Unit) (Other)		TO: <u>ASP II</u>  COPIES TO:		
LOCATION OF AMMUNITION:				
INSTRUCTIONS: (Any special instructions, or necessary information)				
LINE NO	AMOUNT (On Hand) (Required) (Requested)	DOD CODE	NOMENCLATURE (When Required)	REMARKS
	600	C444		
	350	C454		
<div style="display: flex; justify-content: space-between;"> <div> <p>INITIATED BY: <u>BTRY C.O.</u></p> <p>APPROVED BY: _____ (If Required)</p> </div> <div> <p>RECEIVED: DATE _____ TIME _____</p> <p>ISSUED:</p> <p>RECEIVED BY: _____</p> <p>ISSUED BY: _____</p> </div> </div>				

Figure 29.--Standard Ammunition Report Form.

by experience factors, the situation, and future considerations. The artillery S-4 must:

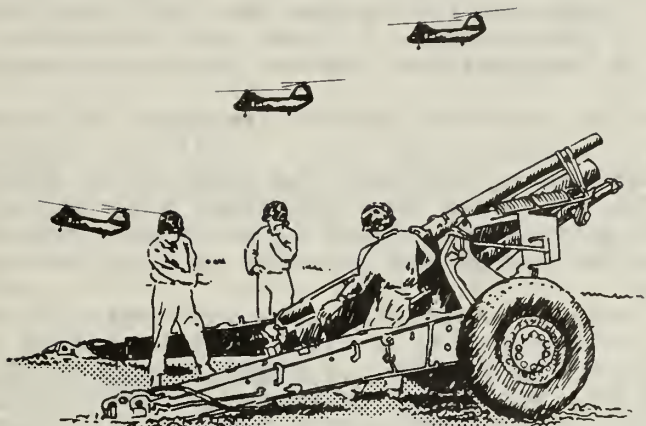
- (1) Perform advanced planning to ensure adequacy of class V(W) supplies for mounting-out and combat operations.
- (2) Maintain records on class V(W) as required.
- (3) Determine and recommend available supply rates as required.
- (4) Maintain liaison with the S-4/G-4 of higher headquarters for the purpose of knowing the status of artillery ammunition, making recommendations, and obtaining the locations of ammunition supply points, dumps, and other facilities.
- (5) Prepare estimates of class V(W) requirements.
- (6) Recommend, in conjunction with the S-3, the number and location of ASP's, dumps, and other ammunition facilities required.
- (7) Supervise ammunition supply and distribution.
- (8) Ensure that requirements for personnel and transportation to support ammunition movement, storage, and distribution are provided.

c. Movement of Ammunition.--Planning the movement of class V(W) materiel is an exacting procedure. Commanders must be able to ascertain the requirements which will be imposed on their subordinate units during operations. Inadequate personnel and transportation create the greatest difficulty. Two types of distribution are considered:

- (1) Supply Point Distribution.--Using units are issued ammunition at the ASP or dump.
- (2) Unit Distribution.--Delivery is made directly to using units at their tactical locations by service elements.







## CHAPTER 5

### TACTICS

#### Section I. GENERAL

##### 5101. INTRODUCTION

Through the maneuver of artillery firepower, commanders possess an effective means in which to influence the battle. The application of artillery to protect the movement of tactical elements, frequently operating with exposed flanks or in tactical areas apart from the main landing force, is necessary. The capability to mass protective artillery fires forward and within widely separated areas partially compensates for the lack of mutual support by direct fire weapons. To accomplish accurate massing of firepower and to exploit the inherent characteristics of field artillery, it is necessary to have sound meteorological information, and accurate survey data. The commander's reconnaissance selection of the occupation of position by his unit is essential to proper tactical application of artillery fire support. Proper organization for combat and assignment of tactical missions to subordinate firing units is far-reaching in its effect.

##### 5102. PRINCIPLES OF WAR

Marine artillery is capable of delivering fire over a zone of great width and depth, and of rapidly shifting and concentrating its fire without physically changing position. The principles of war apply to artillery as to all other arms. Particularly, the principles of mass, economy of force, surprise, and maneuver have special application in the case of artillery, as well as the factor of unity of command.

a. Unity of Command.--Artillery supports and protects the other arms by fire. To accomplish this, it is essential to know when, where, and in what form the other arms require this support. This information is

provided by the commanders who are planning and directing operations or by the troops who are in contact with the enemy. Close and continuous liaison is necessary between supported unit commanders and their supporting artillery commanders both during the planning for and then throughout the battle; coordination cannot be accomplished without unity of command.

b. Mass.--The proper tactical and technical employment of artillery firepower exploits the principle of mass. Artillery weapons need not be physically massed, but rather artillery is employed to provide the maximum capability for massing its fires when and where they are required to support the infantry operations. Means of achieving effective massed fires include the use of survey and transfer of fire techniques.

c. Maneuver.--Maneuver and mass are interrelated. While mass implies the ability to concentrate a large volume of fire on a single target, maneuver implies the ability to transfer and distribute fire rapidly over a wide frontage from one point to another. This capability derives from the inherent mobility of artillery units and the ability to rapidly alter the organization for combat in order to place the bulk of fires where required. Maneuver, therefore, involves the control of massed firepower by those subordinate artillery commanders who are in immediate contact with the situation in forward areas. This flexibility of control is dependent upon the speed and reliability of the communication system.

d. Economy of Force.--The characteristics of artillery, coupled with the application of the principles of mass and maneuver, permit economy in the total allocation of weapons required for support requirements. The coordination of artillery fires with other means of fire support must be such that the full weight of artillery is placed on those targets which cannot be engaged with equal or greater effect by other means. Economy of force implies that the effort allocated to any task shall not exceed that necessary to produce the desired effect. Unnecessary ammunition expenditures involve a waste of effort through the entire channel of supply and must be avoided. The most efficient artillery techniques that obtain the maximum effort on a target and strict control of ammunition expenditures must be employed to attain true economy of force.

e. Surprise.--The principle of surprise is as important to employment of artillery as to any other element of the landing force. Means of achieving surprise include concealment and camouflage, night occupation of position, use of temporary and decoy positions, use of survey and transfer of fire techniques, restrictions on registrations, target acquisition, agencies, firing from unexpected directions and in unexpected volume, the elimination of stereotyped methods, and the judicious employment of special ammunition.

## 5103. CONSIDERATIONS

The basic considerations in the tactical employment of artillery in support of the landing force are:

a. Fire Support Requirement.--Tactical employment of artillery must provide support to the various elements of the landing force in accordance with the estimated requirements for each situation. A standard allocation of artillery units or fires only for the purpose of achieving uniformity may result in waste of valuable resources in some cases, and lack of combat power in others.

b. Massing Ability.--Tactical employment of artillery must provide for massed fires to the degree required and permitted by each situation. The greatest effect on personnel-type targets is achieved when the required volume of fire is delivered on target simultaneously. The ability to mass the fires of units also permits economy in the allocation of artillery units. The separation of tactical units that is likely to occur in warfare is the principle limitation to achieving massed fires.

c. Exploitation of Weapon Capabilities.--Tactical employment of artillery must make maximum use of available weapons according to their capabilities. Each of the several types of artillery weapons and units available to the landing force possess unique capabilities and limitations. Artillery plans must exploit these inherent capabilities and minimize their limitations through proper tactical employment.

d. Facilitate Future Operations.--Tactical employment of artillery must anticipate requirements for subsequent operations. Considerable time is often needed to get artillery units into position and ready to deliver maximum fire support. This time can be materially reduced by early reconnaissance, selection, and preparation of positions, and the assignment of missions and tasks which recognize the probable future employment of the units concerned.

e. Exploitation of Mobility.--Self-propelled and towed artillery are highly mobile and possess the ability to displace rapidly and occupy new positions or to relay and fire in adjacent zones of fire. Additional mobility is provided by use of helicopters to lift artillery to positions not accessible to towed and self-propelled artillery.

#### 5104. ORGANIZATION FOR COMBAT

The organization for combat places each artillery unit within a task organization and assigns a tactical mission to each task organization. The organization for combat is established to provide the means and capability for supporting the plan of operation of the landing force.

a. Basic Factors in Organization for Combat.--The development of an organization for combat is based on consideration of the tactical principles contained in paragraph 5103 and an analysis of the following factors:

- (1) Mission of the supported unit.
- (2) Scheme of maneuver.
- (3) Plan of defense.
- (4) Weapons' capabilities.
- (5) Number and type of artillery units available.
- (6) Availability of suitable position areas.
- (7) Availability of air and naval gunfire support.
- (8) Expected employment of nuclear weapons.
- (9) Provision of continuity of fire support.



- (10) Requirements for massed fires.
- (11) Anticipated future operations.
- (12) Communication capability.
- (13) Provisions for ammunition supply.
- (14) Availability of helicopter support.

b. Fundamentals in Organization for Combat.--The following fundamentals in organization for combat apply to all echelons:

(1) Artillery commanders retain centralized control of their subordinate units when the situation allows. However, when necessary, artillery commanders may decentralize control of their artillery by the assignment of appropriate tactical missions or by attachment to supported units or to subordinate artillery units.

(2) Artillery is organized for combat to provide adequate fire support for units in contact with the enemy, weight to the main attack (offense), additional strength to vulnerable areas (defense), available fire support with which the commander can influence the action, and adequate fire support for the reserve when it is committed.

c. Artillery Groupments.--Groupment of artillery under a headquarters capable of control and coordination of two or more artillery units may be necessary. These groupments may be placed under a headquarters especially designed for this purpose such as headquarters battery, field artillery group. Attachment of artillery is accomplished for logistical and administrative considerations. The attached unit receives its mission from the command to which attached. A description of groupments is provided below:

(1) Field Artillery Group.--FAG consists of a headquarters battery and such artillery units as may be attached. The FAG is task organized according to the requirement for artillery support and is capable of controlling up to six artillery units. FAG may be attached to division artillery or landing force artillery.

(2) Battalion-Group/Battery-Group.--A group may be formed when it is desirable for one battalion (battery) to exercise control over one additional battalion (battery) to a degree greater than would exist under a reinforcing mission. A group is formed of either direct or general support units to facilitate control and direction of fires under a single headquarters, and performs the same functions as these headquarters. Normally, a group will not exceed two units. The senior commander is designated as the commanding officer of the group; the title of the group is the designation of the senior headquarters; e.g., 1st Battalion Group, 11th Marines.

d. Reinforced Artillery Units.--An artillery unit is reinforced by attaching an artillery element to an artillery battery, battalion, or regiment. It differs from groupment in that the units are attached to increase the capability of an individual command to perform a mission. Like units may be used in the reinforcing role.



## 5105. MARINE AIR-GROUND TASK FORCES

The Marine air-ground task forces provided by the Fleet Marine Force include the Marine amphibious unit (MAU), Marine amphibious brigade (MAB), and Marine amphibious force (MAF). These task organizations comprise four major components including a command element, ground combat element(s), aviation combat element(s), and a combat service support element. When the Marine air-ground task force contains only a single ground combat element or when any additional ground combat element(s) is not significant, the artillery will normally be assigned, or be organic to, the senior artillery headquarters of the major ground component. In such cases, the Marine air-ground task force headquarters performs only limited fire support coordination, planning overall fire support requirements and relations with the amphibious task force supporting arms coordination center (SACC). The FSCC with the senior major ground component provides the bulk of the necessary fire support coordination necessary to operations ashore. When the Marine air-ground task force comprises more than one major ground element, the requirement exists for a landing force headquarters to ensure proper artillery support and fire support coordination. A formal FSCC is required.

a. Marine Amphibious Unit.--Capable of performing combat missions of relatively limited scope and duration. The MAU headquarters serves as the landing force headquarters and possesses the ability to exercise detailed planning and to direct and control operations. It is provided primarily from the resources of a division/wing team. MAU artillery support is that normally provided to a battalion landing team (BLT) and consists of artillery appropriate to the mission and situation. Artillery staff representation in the MAU headquarters is provided by the parent artillery headquarters or from the supporting artillery unit(s).

b. Marine Amphibious Brigade.--Capable of conducting sustained air-ground combat operations; however, it is generally employed as the initial element of a larger Marine air-ground task force. The MAB, therefore, is normally organized to accomplish a limited mission with provisions for it to be absorbed by the follow-on forces, usually an MAF. MAB headquarters serves as the landing force headquarters and possesses the ability to exercise detailed planning and to direct and control operations. It is provided from the resources of a division/wing team. No more than one MAB is normally formed from a single division/wing team. However, each division/wing team, when reinforced by appropriate force troop units, has the capability to deploy two MAB's for separate missions should unusual circumstances require such flexibility. MAB artillery support is that normally provided to a regimental landing team (RLT) and consists of a reinforced artillery battalion or artillery as appropriate to the mission and situation. Artillery staff representation in the MAB headquarters is provided by the parent artillery headquarters or from the supporting artillery unit(s).

c. Marine Amphibious Force.--The type of Marine air-ground task force required for sustained combat missions beyond the resources of the MAB. It may include one or more divisions and/or several major ground combat organizations; i.e., division(s) and/or RLT(s) according to the requirements of the operation and the units available. Although there is no provision for the MAF artillery headquarters within current MAF T/O's, this capability may be provided by a properly augmented field artillery headquarters battery. The field artillery group(s) or force artillery firing batteries may be retained under the MAF artillery headquarters or assigned to the organic artillery headquarters of the division(s) and RLT(s). See Figure 30 for an illustration of the artillery with the MAF.

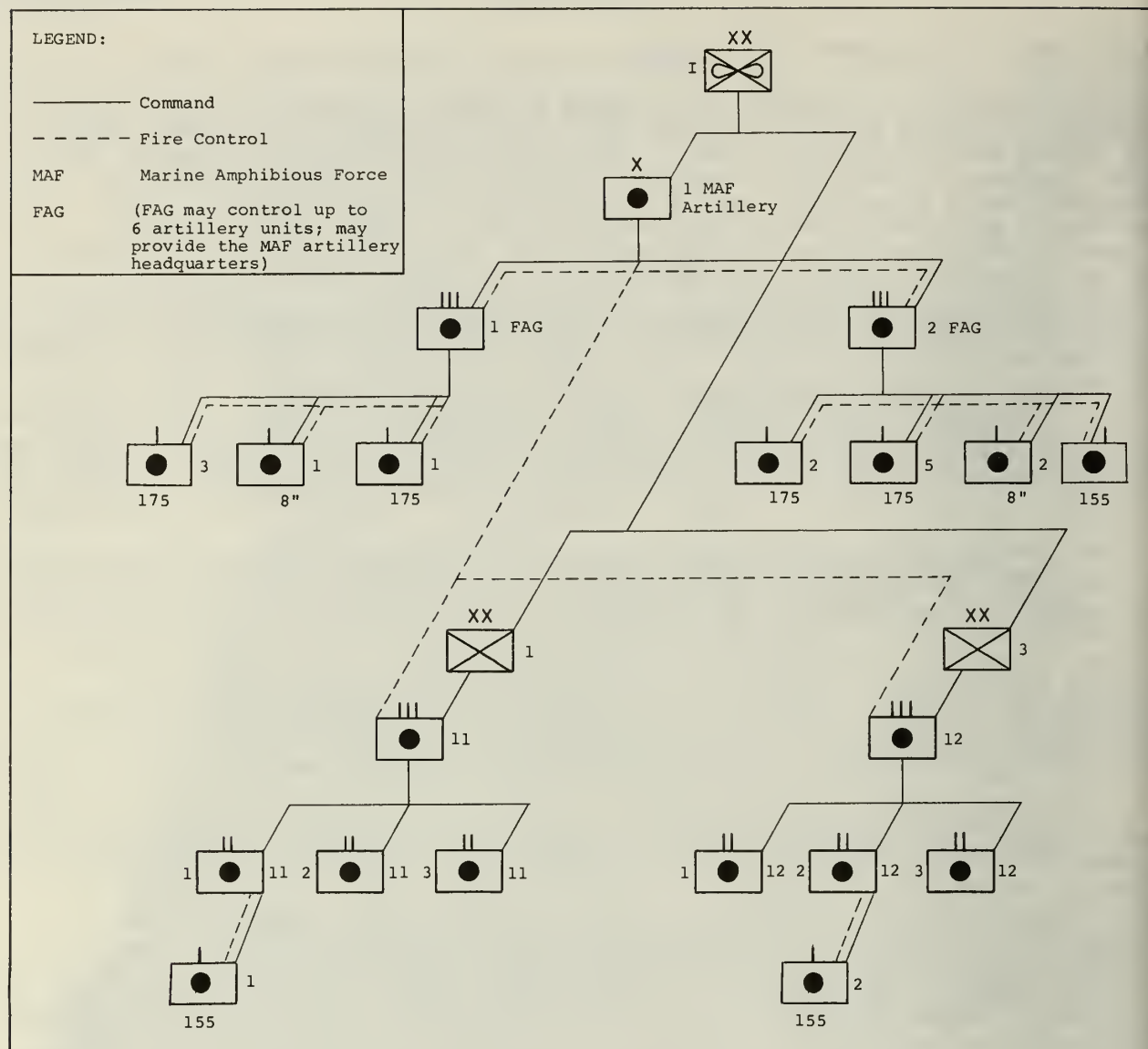


Figure 30.--Landing Force Artillery Task Organization.

#### 5106. TACTICAL MISSIONS

A tactical mission is the fire support responsibility assigned to an artillery unit. The inherent responsibilities in each type tactical mission are set forth in figure 31. Tactical missions are assigned by the force commander to which the artillery is attached on the recommendation of his artillery officer. Attachment is not a tactical mission but rather a status. (See QSTAG 217.)

a. Direct Support.--Requires an artillery unit to assign forward observers to, and establish liaison with, the supported unit and plan and deliver fires in direct response to the needs of the supported unit. The

FA unit with a mission of	Answers calls for fire in priority from	Establishes liaison with	Establishes communications with	Has as its zone of fire	Furnishes forward observers	Is positioned by	Has its fires planned by
Direct Support	1. Supported unit 2. Own observers 3. Higher artillery headquarters	Supported unit (down to battalion level)	Supported unit	Zone of supported unit	To each company sized maneuver element of supported unit	Unit commander as deemed necessary or ordered by higher artillery headquarters	Develops own fire plan
Reinforcing	1. Reinforced unit 2. Own observers 3. Higher artillery headquarters	Reinforced unit	Reinforced unit	Zone of fire of reinforced unit	Upon request of reinforced unit	Reinforced unit, or ordered by higher artillery headquarters	Reinforced unit
General Support	1. Higher artillery headquarters	No inherent requirement	No inherent requirement	Zone of supported unit	No inherent requirement	Higher artillery headquarters	Higher artillery headquarters
General Support Reinforcing	1. Higher artillery headquarters 2. Reinforced unit 3. Own observers	Reinforced unit	Reinforced unit	Zone of supported unit to include zone of reinforced unit	Upon request of reinforced unit subject to prior approval of higher artillery headquarters	Higher artillery headquarters or reinforced unit subject to prior approval by higher artillery headquarters	Higher artillery headquarters

Figure 31.--Tactical Missions (Inherent Responsibilities).

fires of a unit assigned this mission may be directed to other purposes; however, this is not done when such action would conflict with the delivery of direct support fires.

b. General Support.--Requires a unit to support the force as a whole. This mission is usually supplemented by instructions concerning zones of fire and position areas. The fires of a general support unit are controlled by the next higher headquarters. These units provide the commander with an immediately available source of firepower which he can allocate to subordinate commands and thereby influence the outcome of widely separated actions.

c. Reinforcing.--Requires a unit to respond directly to requests for fires from another artillery unit. Reinforcing artillery remains under the command of the higher artillery commander, but receives its zones of fire and all fire missions from the reinforced unit. The reinforcing unit establishes liaison and direct communications with the reinforced unit in order to minimize the time required to answer calls for fire.

d. General Support-Reinforcing.--Provides that the artillery unit will support the force as a whole and additionally answer calls for reinforcing fires of another artillery unit. A unit with this mission displaces on order of the next higher artillery headquarters, or as requested by the reinforced unit subject to approval of the next higher artillery commander. The unit commander must be prepared to recommend actual position areas and to advise the higher artillery commander when displacement is necessary. Priority of fires is to the force as a whole unless otherwise specified by the commander.

e. Modification of Tactical Missions.--May be modified by the commander responsible for assigning the missions. When one of the inherent



fire support responsibilities is modified, changed, or limited, the mission is said to be modified. Whenever the intent of the commander cannot be accurately and completely conveyed by the use of a standard tactical mission, a standard mission may be modified or amplified by appropriate instructions. In the modification of a standard tactical mission, care must be taken not to degrade the ability of the unit to accomplish the specific inherent support responsibilities of that standard mission. A tactical mission of direct support should not be modified.

f. Warning Orders.--Serve to alert units of anticipated changes in their tactical missions. Any foreseeable change in the tactical mission should be included. For example: "general support, prepared for direct support," provides that the general support unit will support the force as a whole and be prepared, at any time, to support a particular infantry unit directly. This type of order enables the unit commander to plan and initiate preparations to facilitate the future transition.

#### 5107. ZONES OF FIRE

To ensure that fires can be distributed and massed as required, zones of fire are designated for all artillery units. The zone of fire indicates the lateral and sometimes the short and far limits within which the unit may fire. Zones of fire are assigned in agreement with the tactical mission of artillery units.

a. Normal Zone of Fire.--The normal zone of fire of artillery units is assigned by the artillery commander and is based on the following:

(1) Direct Support Unit.--The normal zone of fire of a direct support artillery unit coincides with the zone of action or sector of defense of the supported infantry unit. Units in direct support have primary responsibility for observation and fire in their normal zones.

(2) General Support Unit.--The normal zone of fire of a general support artillery unit may be either the zone of action or sector of defense of the command as a whole, or a specified portion of the zone or sector.

b. Contingent Zone of Fire.--Contingent zones of fire are additional zones assigned to artillery units to ensure complete artillery coverage and to provide maximum fire on points critical to the success of the operation. Contingent zones may also be assigned to cover dead spaces in the normal zones of fire of direct support units.

#### 5108. ARTILLERY WITH UNITS IN RESERVE

Artillery is not held in reserve. Organic artillery of a division in reserve may be employed in support of another division. Plans for the utilization of the fires of these artillery units should be integrated with the overall artillery fire plans in such a way that these plans will not suffer a major disruption on their withdrawal. Organic artillery units of a reserve division must prepare plans to reassemble their subordinate elements so they can give adequate support to the parent division when it is committed.



## 5109. AUXILIARY WEAPONS

When directed by the appropriate commander, the fires of units with weapons capable of employment as artillery may be used to supplement the fires of the supporting artillery. For maximum effect when employed in an artillery role, units with such weapons should be connected to artillery by survey, liaison, and communications. Examples of units with weapons suitable for use in the field artillery role are tank units and captured and replacement guns and tanks.

a. Employment of Units.--The employment of auxiliary weapons as field artillery is facilitated by assigning the unit a mission of reinforcing an organic artillery unit which has the means readily available for assisting the reinforcing unit.

b. Responsibility.--The commander of the reinforced artillery unit is responsible for the coordination and employment of all available resources of both the reinforced and reinforcing unit. This may entail assistance to the reinforcing unit in any or all of the following:

- (1) Designation of position areas.
- (2) Arranging for adequate observation means.
- (3) Providing necessary survey control.
- (4) Providing tactical and technical fire direction.
- (5) Assisting with artillery type training and supervision.
- (6) Providing the required communications.
- (7) Providing staff supervision for services and supplies.

## Section II. OFFENSE

## 5201. GENERAL CONSIDERATIONS

Artillery in support of offensive operations must be organized and deployed to provide the most responsive and most appropriate fire support to the maneuvering force, furnish continuous support during the action, and protect the attacking force during consolidation and reorganization. The weight of artillery firepower and priority of fires is normally given to the main attack. During a reconnaissance in force and during the frontal attack in a coordinated attack, exploitation, or pursuit, control of fire support is normally centralized to facilitate adding combat power to the maneuver units as required. During a movement to contact and during the penetration or envelopment in a coordinated attack, exploitation, or pursuit, control may be decentralized, priority of fire established, or artillery units attached to the forward or main attack forces.

## 5202. ACTIONS PRIOR TO THE ATTACK

Actions which must be accomplished by the artillery prior to the attack include:

- a. Development of an organization for combat and preparation of a plan of fire support.
- b. Reconnaissance, selection, and occupation of firing positions.
- c. Establishment of communications with the supported unit.
- d. Provision of common survey control for firing units and target acquisition agencies.
- e. Organization and coordination of observation.
- f. Establishment of liaison and coordination of fire support.

## 5203. ARTILLERY POSITIONS IN THE OFFENSE

a. General.--Responsibility for the selection of field artillery positions is indicated by the tactical mission assigned the artillery. Positions should be carefully selected to insure that continuous and effective fire support is provided to the maneuver force throughout the offensive operation.

b. Position Areas.--In the offense, the selection of position areas is normally based on the following considerations:

- (1) Artillery is placed as far forward as practical to exploit the range of the weapons and to facilitate liaison and communications.
- (2) Position areas are selected in the zone of action or area of responsibility of the supported unit to avoid interference with other units.

(3) Positions should facilitate organization and future operations.

c. Alternate and Supplementary Positions.--All artillery commanders are responsible for the selection of necessary alternate and supplementary positions. These positions are not as critical in the offense as in the defense, but should be prepared to the maximum extent possible. (See par. 5504b.)

#### 5204. OFFENSIVE FIRES

a. Fire Planning.--Fire planning is continuous. A thorough knowledge of fire planning is necessary to obtain maximum effects from available artillery means. See chapter 3 for a detailed discussion of artillery fire planning. An effective plan for the use of artillery fires must:

(1) Provide for adequate support for the scheme of maneuver of the supported force.

(2) Provide for the use of weapons according to their capabilities for target defeat.

(3) Provide for massed fires throughout the zone of action of the supported force.

(4) Facilitate future operations.

b. Fires Before the Preparation.--Fires before the preparation usually consist of registrations, fires on targets of opportunity, and fires covering the deployment and movement of the attacking troops into position. Harassing and interdiction (H&I) fires may be employed to restrict enemy operations, disrupt communications, and prevent the movement of enemy reserves.

#### c. Registration

(1) Registration increases the accuracy of artillery fires, permits placing unobserved fires close to friendly troops, and saves ammunition. However, unrestricted registration discloses artillery positions and, thereby, indicates strength and deployment, signifies the commander's intentions, and invites neutralization. These disadvantages can be minimized by:

(a) Using special registration positions.

(b) Limiting the number of batteries to register.

(c) Registering as late as possible before the attack.

(d) Registering several units simultaneously.

(e) Employing meteorology plus velocity error (Met plus VE) techniques to reduce the need for registration.

(f) Using common survey control and current meteorological data.

(2) The artillery commander recommends to the supported unit commander whether registration will be restricted, prohibited, or unlimited. When conditions indicate a need to restrict registration, the artillery commander coordinates registration.

d. Preparation.--The artillery commander recommends to the supported unit commander whether a preparation will be fired and, if so, its duration. The time length of the preparation may vary from a few minutes to several hours, depending on the degree of surprise required, the amount of ammunition available, and the number of confirmed (known) or suspect (possible) targets. The preparation may be divided into phases. In general any division of a preparation into phases should provide for gaining fire superiority over hostile artillery in the early phases, neutralization of hostile artillery throughout the preparation, disruption of command and communication systems, and delivery of massed fires on enemy forward elements just prior to the assault. These phases allow the artillery to attack, in succession, various types of targets according to priority.

e. Fires During the Attack.--Fires during the attack are delivered to assist the advance of the supported unit. Successive attacks on confirmed or suspect enemy locations may be prearranged. Fires must be planned beyond the final objective, including fires on likely avenues of approach, to protect the attacking unit during its reorganization.

f. Meeting Engagements

(1) Artillery in support of a movement to contact, or a reconnaissance in force, must be adequately dispersed in the formation to support any action in any direction. Normally, artillery elements are most dense in the forward area of the formation. When the advance guard, flank, or rear guards deploy, supporting artillery occupies positions at once to support them.

(2) Artillery support is not limited to planned fires. The timely delivery of fire is given first consideration. The artillery moving to positions should be given road priority.

(3) Heavier caliber weapons are emplaced along the route of march to provide supporting fires when required.

g. Exploitation and Pursuit.--Artillery in support of an exploitation of pursuit normally is attached. Artillery attached to an exploiting or pursuing force must have a high degree of mobility due to the fluidity of these types of operations.

h. Reconnaissance in Force.--Artillery is one of the principal sources of combat power in the support of a reconnaissance in force. Although the primary aim of this tactic is reconnaissance, it may disclose weaknesses in the enemy disposition which, if promptly exploited, will permit tactical success. Reconnaissance in force may be part of either defensive or offensive operations. For details, see FMFM 6-1, Marine Division, and FM 61-100, The Division.



## Section III. DEFENSE

## 5301. GENERAL CONSIDERATIONS

Artillery must be prepared to support all types of defensive operations and all phases of the defensive action. It must be capable of massing fires on critical terrain beyond the range of the weapons organic to the supported unit. The artillery must be prepared to fire in any area by rapidly shifting its direction of fire or by firing in several directions simultaneously from a single firing position. It augments the defensive fires of the supported force with final protective fires and other prearranged fires such as antimechanized fires.

## 5302. ARTILLERY POSITIONS IN THE DEFENSE

a. General.--The rapid availability and concentration of artillery fire is essential to a successful defense; therefore, centralized control is desired. Every effort is made to meet the enemy main attack with a mass of artillery fires. Deception is employed to mislead the enemy as to the amount of artillery and its locations. Position areas are selected throughout the section. Organization of artillery positions, target acquisition, survey, communications, and fire planning are as complete as time and situation permit.

b. Position Areas.--In the defense, the selection of position areas for the artillery normally includes the following considerations:

(1) Artillery is echeloned in depth to insure that the continuous artillery fire support can be provided within the battle area.

(2) All division artillery is positioned so that it can fire immediately in front of the forward edge of the battle area (FEBA).

(3) Some artillery units may be placed in forward supplementary positions to provide counterbattery and longer range harassing and interdiction fires and to deceive the enemy as to the true location of the primary positions.

(4) The advantage of defensive terrain features and access to a route of withdrawal are considered.

(5) Priority of positions is given to units providing direct support to the maneuver elements in contact.

(6) Whenever possible, position areas are selected in the zone or area of responsibility of the supported unit to avoid interference with other units.

(7) Positions should be selected to facilitate organization and future operations. All units prepare their positions for defense against ground and air attack. Camouflage is stressed.

(8) Firing units may displace frequently to preclude being pinpointed as a target. The displacement should be so conducted as not to disclose a pattern.

(9) In nuclear war or the threat of nuclear war, batteries should be prepared to split into three or two howitzer/gun platoons; e.g., battery minus and platoon plus. Headquarters will also establish two command posts. Nuclear capable units may also establish special single weapon positions keyed particularly to nuclear warhead delivery.

c. Alternate and Supplementary Positions.--Artillery commanders at each echelon are responsible for the selection of necessary alternate and supplementary positions and for insuring that the positions are prepared to the extent possible. Alternate positions are usually occupied only when the primary positions become untenable. Supplementary positions are usually occupied only after approval by the commander of the supported force or by a higher artillery headquarters.

### 5303. DEFENSIVE FIRES

a. Fire Planning.--Detailed fire planning is essential to effective artillery support of defensive operations. See chapter 3 for a detailed discussion of artillery fire planning. Defensive fires are planned to:

- (1) Delay and disorganize the enemy's approach.
- (2) Disrupt the enemy's attack preparations by use of counter-preparation fire.
- (3) Impede the enemy's attack by use of the close defensive fires in width and depth throughout the sector.
- (4) Break up the enemy's assault by use of final protective fires.
- (5) Limit penetrations by use of on-call fires.
- (6) Support the counterattack and associated limited offensive actions.

#### b. Phases of Defensive Fires

(1) Fires Delivered Before the Enemy Forms for the Attack.--Fire delivered before the enemy forms for the attack include harassing and interdiction fires which will force the enemy into early deployment, and fires in support of security forces (covering and general outpost forces).

(a) Harassing and interdiction fires are usually planned by the landing force or division artillery headquarters. Planning is based on studies of maps, terrain, road nets available to the enemy, enemy organization and tactics, and all other target intelligence. Targets suitable for harassing fires are enemy batteries, assembly areas, observation posts, communication centers, command posts, and leading elements. Targets suitable for interdiction fires are harbors, road junctions, bridges, and crossroads. H&I fires are irregularly timed to prevent the enemy from determining their pattern.

(b) Fires in support of a security force are usually planned by the highest field artillery echelon with that security force. Included are all fires planned to cover the withdrawal of the security force. These fires often include fires from the artillery with the main force.

(c) Artillery supporting a general outpost force will usually fire from supplementary positions to avoid disclosing the positions prepared for use in support of the battle area.

(d) The time of opening fire is decided by the force commander. Premature firing, which may expose the artillery to neutralization and reveal the plans of the defending force, is avoided. Firing is usually confined to the attack of targets presenting the greatest danger to the defending force.

(2) Counterpreparation

(a) Counterpreparation fire is intensive prearranged fire delivered just prior to the initiation of the enemy attack. It is designated to break up enemy formations; disorganize the enemy's systems of command, communications, and observation; decrease the effectiveness of his artillery preparation; and shatter his offensive spirit. A counterpreparation fire is delivered in a scheduled sequence and is fired only on the order of the force commander.

(b) Premature firing must be avoided, since it provides the enemy with counterfire data for his artillery preparation and indicates to him the areas to be avoided in forming for the attack. The timely delivery of counterpreparation fire is critical, particularly when the enemy attacking force is strong in artillery.

(3) Fires Delivered During the Enemy Attack.--If the enemy is successful in launching his attack, fires are delivered to break up his attack and limit his penetration. Included in these fires are final protective fires of the artillery and mortars.

(4) Fires Delivered in Support of a Counterattack.--If previous fires fail to break up or stop the enemy attack, artillery fires are delivered in support of the counterattack to blunt the nose of the penetration, to destroy the enemy forces within the penetrated area, and to seal off the base of the penetration to prevent reinforcements from entering the penetrated area.



## Section IV. RETROGRADE OPERATIONS

## 5401. GENERAL

Retrograde operations are classified as delaying actions, withdrawals, and retirements. Artillery units supporting retrograde operations should be highly mobile. Artillery fires are employed to deceive, disrupt, or destroy the enemy, to delay his advance; to neutralize enemy artillery; to assist the maneuver elements in disengagement; and to support limited counterattacks and tank sweeps. Details of the maneuver aspects of retrograde operations are given in FMFM 6-1, Marine Division and FM 61-100, The Division.

## 5402. ARTILLERY EMPLOYMENT IN RETROGRADE OPERATIONS

a. General.--A force engaged in a retrograde operation usually is weaker than the enemy. Therefore, the skillful and aggressive use of artillery firepower is critical to the successful accomplishment of the force's mission. Artillery units are organized for combat to provide maximum flexibility and versatility of employment. Centralized control is retained to the maximum degree feasible. The assignment of tactical missions must provide for effective support to the committed maneuver elements, and retention at the landing force field artillery level of the capability to shift fires and units rapidly to meet unforeseen tactical contingencies.

b. Planning and Execution.--Detailed planning for the employment of field artillery is conducted at landing force field artillery level. Execution is decentralized to the field artillery commanders at lower echelons to insure responsiveness to the field artillery support requirements of the maneuver elements of the force.

c. Positions.--Initially, field artillery is positioned well forward to exploit the range of its weapons. Positions to the rear are selected and occupied as required to provide continuous field artillery fire support during retrograde operations.

## 5403. ARTILLERY FIRE PLANNING

Field artillery fire support requirements are met through centralized planning and decentralized execution. Fires are planned on enemy avenues of approach, assembly areas, and troop concentrations, and on and behind the friendly position to support disengagement and withdrawal. The priority targets are enemy forward elements, fire support means, and local reserves. Fires may include all types of ammunition. Planned fire support is closely integrated with plans for the employment of the maneuver elements of the command.

## 5404. DELAYING ACTION

Field artillery supports a delaying action by delivering long range fires from positions well forward to inflict damage to delay the advancing enemy. Field artillery is echeloned in depth to permit maximum continuous support as the enemy closes on the maneuver elements and forces them to yield ground. Field artillery battalions usually displace by echelon.



to insure that some fire units are always in position to respond to calls for fire. Ground and air observation to the front and flanks is maintained to permit surveillance of fires and adjustment of fire on targets of opportunity, and to provide continuous information concerning friendly and enemy activity.

#### 5405. WITHDRAWAL (NOT UNDER ENEMY PRESSURE)

Field artillery supports the withdrawal (not under enemy pressure) by providing continuous fires to the detachments left in contact. Field artillery units of representative calibers, in strength proportionate to the strength of the detachments left in contact, remain in position to cover the withdrawal. The remainder of the field artillery displaces with the main body to new positions to the rear. Close liaison and coordination are effected with the security detachments to ensure the adequacy and timeliness of field artillery fires and to coordinate displacement of the artillery remaining. The normal pattern of fires is maintained, if practical, to enhance deception and to cover the noise of displacing vehicles. Detailed fire plans are prepared to deceive the enemy and to counter, delay, disorganize, and disrupt his attempts to interfere with the withdrawal operation.

#### 5406. WITHDRAWAL (UNDER ENEMY PRESSURE)

a. Field artillery supports the withdrawal (under enemy pressure) by delivering fires to assist in disengagement and to delay, disorganize, and disrupt the enemy advance. Artillery units displace to the rear by echelon, in close coordination with the movement of the supported force. For purposes of deception, representation of all types of artillery with the force is maintained when appropriate. Timing is critical. General support artillery is employed to provide additional fire support. Massed fires are delivered against enemy forces threatening the success of the withdrawal. When the situation warrants, control of displacements is delegated to lower echelon commanders to facilitate timing and coordination with the disengaging elements. Multiple routes of withdrawal are used whenever possible to speed the withdrawal and to avoid excessive concentrations of troops and vehicles.

b. If enemy pressure prevents a friendly element from disengaging, a limited counterattack or tank sweep may be launched to relieve the pressure. Artillery supports the counterattack with all available fires, including smoke, if needed, to screen friendly movements. Detailed coordination of fires with the maneuver units is essential.

#### 5407. RETIREMENT

Strong field artillery support is provided to the security forces during a retirement. Field artillery is positioned throughout the retirement columns to support the main body or to furnish additional support to the security forces.

#### 5408. WITHDRAWAL THROUGH A REARWARD POSITION

Retrograde operations frequently terminate in a withdrawal through a rearward position. Additional information is discussed in section V of this chapter.

## Section V. RECONNAISSANCE, SELECTION, AND OCCUPATION OF POSITION

## 5501. GENERAL

a. Purpose and Scope

(1) The purpose of reconnaissance, selection, and occupation of position (RSOP) is to assist the rapid and orderly movement of the field artillery unit from a position area, an assembly area, or a march column into a position from which it can deliver the fire support required to accomplish its mission.

(2) The principles and techniques set forth in this section are applicable to all field artillery units.

b. Reconnaissance

(1) General.--Field artillery reconnaissance is the examination of the terrain as a basis for the selection of advantageous locations for cannons, support installations, and personnel. Some of the factors considered during the reconnaissance are fields of fire, road networks, communication routes, location of friendly forces, active and passive defensibility, and communication and electronic security. The reconnaissance should be planned, and the reconnaissance party should be limited to the personnel, vehicles, and equipment actually required.

(2) Types of Reconnaissance

(a) Map Reconnaissance.--Any reconnaissance should begin with a map inspection. Potential locations and routes can be chosen and obviously unsuitable ones are immediately eliminated. A reconnaissance based only on map inspection has certain limitations; terrain features may have been changed or altered since the map was compiled and the daily variations in surface condition cannot be determined. A map reconnaissance without any supporting information should only be used when there is no alternate means available. Aerial photographs should be used to supplement maps because they are usually more recent, provide more detail, and present a clearer picture of current conditions. When time does not permit a ground or aerial reconnaissance, a map reconnaissance may be substituted.

(b) Ground Reconnaissance.--The best method of positively determining the suitability of positions and routes is to travel over the territory. The true condition of the ground is especially critical if the surface has been affected by enemy action and weather conditions.

(c) Air reconnaissance.--If time or the situation does not permit a ground reconnaissance, the next best method is an air reconnaissance, preferably by helicopter. Air reconnaissance is fast and not restricted by terrain obstacles. The information gained, however, is not as detailed as a ground reconnaissance since terrain features or the true surface condition may not be distinguishable or may appear different from the air.

c. Selection of the Position.--The factors affecting the selection of position areas are the mission, terrain, weather conditions, type weapon with which the unit is armed, and the tactical situation. Position areas which afford electronic security, concealment, and defilade, sufficient space to disperse battery installations, and terrain suitable for defense of the unit are desirable. The essential characteristics of a position, however, is that it permits the unit to accomplish its mission.

d. Occupation of the Position.--The occupation of the position area should be orderly, quiet, and in conformance with the unit SOP. Speed of occupation is obtained by training and a well planned reconnaissance and selection of that position.

#### 5502. STEPS IN RSOP

a. General.--Placing a unit in position involves several tasks which are performed simultaneously or in sequence. The manner of accomplishing these tasks varies with the mission, the time available, and the type of unit. A self-propelled field artillery battery, when operating as a part of a task force, will frequently occupy positions (often from march column) with little previous reconnaissance. In this case, prompt delivery of fire takes precedence over all other considerations. Helicopterborne artillery must make its reconnaissance and selection of initial positions from photographs or maps, since the helicopterborne artillery commander normally has no prior opportunity to see or point out positions on the ground. Upon arrival in the landing zone, the batteries must be prepared to go into action by piece, if necessary, consolidating and organizing their positions as the situation permits. A standing operating procedure for the reconnaissance, selection, and occupation of position is necessary to expedite rapid and efficient emplacement of installations. In all cases, the general principles apply, varying only in their application.

b. Sequence of Events in RSOP.--The sequence and procedures for an RSOP may include the following steps:

- (1) Receipt of orders (own initiative for field artillery battalion commanders with a direct support mission).
- (2) Planning the reconnaissance.
- (3) Conference with the supported or reinforced unit commander.
- (4) Reconnaissance for the release point, battery positions, observation posts, countermortar radar position and meteorological station (when appropriate), command post, aid station, and routes and selection of the actual locations on the ground for the elements of the battalion.
- (5) Formulation of a plan for occupation of the selected positions.
- (6) Issuance of orders to carry out the plan.
- (7) Preparation for occupation--survey, installation of communications, and route marking.
- (8) Movement of the unit to the position area.



(9) Occupation and organization of the position.

(10) Location of a helicopter pad, normally unmarked until just prior to use.

# 5503. RECONNAISSANCE, ARTILLERY BATTALION

## a. Planning a Reconnaissance

(1) Planning and Tasking.--Reconnaissance enables the battalion commander to make decisions on which to base his orders for occupation. The reconnaissance tasks which the commander assigns to members of this party depend on the time available, the size of the area to be covered, the size of the party, and the personal desires of the commander. Shown below is an example of reconnaissance tasks that may be performed by members of the battalion commander's party. The battalion commander may desire to make an initial reconnaissance of the battery positions and routes by means of aircraft.

<u>Reconnaissance or Task</u>	<u>Performed By</u>
Selects the registration point.	S-3 and/or reconnaissance and survey officer.
Formulates the plan of observation including locations of observation posts and areas of responsibility and general radar areas when applicable.	S-2.
Formulates the survey plan.	Survey/metro officer.
Selects position areas and routes.	Reconnaissance and survey officer or S-3 (battery commander, if available).
Formulates communication plan.	Communication officer.
Selects countermortar radar site, if attached.	Radar technician and/or section chief.
Selects the meteorological station location.	Survey/metro officer.
Selects the battalion aid station location.	Headquarters battery commander and/or representative of the medical section.
Checks camouflage and security.	S-2.
Recommends perimeter defense and unattended ground sensor locations.	S-2.
Selects starting point (SP) and release point (RP).	S-3.



(2) Conference With Supported or Reinforced Unit Commander.--

On receiving a direct support or reinforcing mission, the battalion commander establishes liaison with the supported or reinforced unit. If he has been assigned a position area by the higher commander, he starts his reconnaissance for battery positions, observation posts, and other installations at once. If he has not been assigned a position area, he may have to confer with the supported or reinforced unit commander (if available) before completing his reconnaissance. Usually, the battalion commander starts his reconnaissance immediately and chooses tentative locations for various installations, making the final decision following his conference with the supported or reinforced unit commander.

(3) Battalion Commander's Party.--The battalion commander's party consists of the personnel and equipment needed to assist the commander in his reconnaissance, the formulation of his plan, the issuance of orders, and the preparation for the occupation of the position. The composition of the party will vary according to the mission, and the restrictions that may be imposed. In general, it is desirable that the commander include in his party the S-2, the S-3, the communication officer, the survey officer, and a messenger. If possible and appropriate, he may take with him any or all of the following:

- (a) Battery commanders and their parties.
- (b) Survey personnel.
- (c) Wire laying vehicles and personnel.
- (d) The ammunition NCO.
- (e) A representative of the medical section.

(4) Battalion Commander's Instructions

(a) Action Prior to Leaving the Area.--Before leaving the bivouac or assembly area, the battalion commander briefs the battalion executive officer and issues orders to expedite the occupation of the position. Depending on his current information, he may issue orders concerning the movement of elements of headquarters battery, staff officers, and battery commanders and their parties to a location from which they can be brought forward quickly to receive the battalion order. The orders may also concern probable routes, start points, release points, time of movement, and use of route markers plus prearranged radio codes for use during movements and probable order of march.

(b) Instructions for Reconnaissance Party.--After briefing the selected staff officers, the battalion commander assembles the members of his reconnaissance party, briefs them on the situation, and issues the necessary instructions to include the requirement for chemical or radiological reconnaissance, if necessary. He points out, on the ground or on a map, the general location for the position area and the tentative general location for each installation. If he plans to make a personal reconnaissance, he designates the time and place where he will issue his orders. If he assigns tasks to members of his party, he designates the time and place for the reassembly of the party.

(5) Map Reconnaissance.--Planning should be coordinated with the supported or reinforced unit before the start of the march. From a map reconnaissance, possible position areas and observation posts along the route are marked on maps and/or photographs. Manmade objects and terrain features that can be identified from the ground and can serve as control points and future reference points are marked with numbers. Phase lines may also be used to facilitate instructions. This procedure allows the marching unit to have prior knowledge of potential positions before the march commences.

b. Executing the Reconnaissance

(1) Route Reconnaissance.--Air and forward observers, liaison officers, communication personnel, and survey parties are primary sources of information regarding the availability and conditions of routes within the zone of advance. Route reconnaissance parties report on the number of route markers needed, the strength and condition of bridges, and the possible presence of minefields. When the route of displacement is selected, the route reconnaissance party should be prepared to clear and mark routes through minefields.

(2) Reconnaissance of the Position.--The battalion commander seldom performs all the operations of the reconnaissance personally. While the members of his party are performing their assigned reconnaissance duties, the commander may confer with the supported or reinforced unit or he may make a general terrain evaluation of the entire area to be occupied. During battalion operations, the commander, staff officer, or the battery commanders make a reconnaissance of position areas prior to the arrival of the batteries. The battalion commander continues the reconnaissance and issues the orders necessary to complete the occupation. The selection of a location for the command post is influenced by the locations selected for the battery positions, the location of the command post of the supported unit (if known), and the situation. Radio is used for communications until wire circuits are installed.

(3) Position of Reconnaissance Party in March Column

(a) During the march with a supported combat unit, a reconnaissance party from the supporting artillery normally marches with the advance elements of the column. When required, the chemical detection and radiological survey team of the battery NBC team is positioned with the forward element. The officer in charge of the artillery reconnaissance party reconnoiters the position areas which have been previously designated and reports his findings to the battalion commander. In addition, commanders may use aircraft for reconnaissance and security during a march. Within a supporting artillery battalion, battery commanders and their parties may march at the head of the artillery column.

(b) Artillery commanders, accompanied by a reconnaissance party, usually precede their units when they are part of a surface march column of a supported combat organization. Depending on his mission and knowledge of the situation, the artillery commander reconnoiters positions along the route as necessary. Frequently, the commander's knowledge of the situation will allow him to proceed directly to the position area, select the positions, and order the units into them.

(4) Continuous Reconnaissance.--The principles of reconnaissance and selection of positions for a displacement are, in general, the same as for an initial occupation. The battalion (battery) commander should continuously reconnoiter in his zone for positions, observation posts, and routes to meet any requirement. When time permits, survey control is carried forward or to the rear, and communications are installed before the displacement.

#### 5504. SELECTION OF THE BATTALION POSITION

a. General.--The term "battalion (battery) position area" is defined as that area occupied, or to be occupied, by the battalion (battery) with its elements disposed to provide fire support for the supported force. Position areas designated in orders, on maps, or on overlays indicate the area within which the weapons must be placed but do not constitute a rigid restraining line for all elements of the battalion (battery). Normally, artillery battalions with a mission of direct support have priority for positions in the division area.

b. Classification of Positions.--Artillery positions are classified tactically as primary, alternate, and supplementary. They are defined as follows:

(1) A primary position is a position from which the battery intends to accomplish its tactical mission. Plans should be made to organize and improve the primary position for permanent occupancy although the tactical situation may require displacement at any time.

(2) An alternate position is a position to which the battery moves when the primary position becomes untenable or unsuitable for carrying out the assigned task. The alternate position must meet all the requirements of the primary position so that the battery can continue to fulfill its original task. The alternate position must be close enough to the primary position to permit rapid displacement, but distant enough to prevent its being rendered untenable by the same action that affects the primary position. At least one alternate position should be selected for each primary position, and all preparations necessary for occupation should be made consistent with the time available.

(3) A supplementary position is a position to which the elements of the firing battery may move to attack targets which cannot be fired on from the primary or alternate position or from which registrations may be conducted when secrecy is essential. Supplementary positions may be constructed to improve the direct support capabilities of the unit. Roving gun positions are considered supplementary firing positions.

c. Position Areas in the Offense.--Field artillery positions should be selected well forward towards the FEBA. The generally accepted distance behind the FEBA is approximately one-third of the maximum range capability of the field artillery weapons that are supporting the attack. This distance is used in order to avoid early and untimely displacement. When circumstances warrant, the battalion may occupy and organize the position without firing from it prior to the attack. Registration, interdiction, and harassing fires may be delivered from supplementaty positions, and all fires from the primary position may be withheld until the preparation is fired or when the attack starts.



d. Methods of Positioning Artillery Units

(1) There are four general methods of employing field artillery units in position areas. These methods are applicable to all artillery battalions and to nondivisional artillery battalions. Each method has advantages and disadvantages. The value of a particular method depends on the type of unit, the situation, the mission, and the capabilities of the enemy. The methods can be modified and combined to meet the requirements of each situation.

(2) The four methods of positioning artillery units are as follows:

(a) Method 1.--In method 1, the battalion occupies a position area (see fig. 32). The position area always includes the firing positions. The firing batteries and the headquarters battery are within the same perimeter. The battalion commander selects or recommends alternate and supplementary positions to which the battalion or elements of the battalion can displace.

1 The principal advantages of method 1 are:

a The problems of command, administration, messing, survey, communications, and local security are simplified.

b The time and effort required for resupply of ammunition to the firing sections are reduced.

c Reaction time and the ability to meet firing schedules are improved.

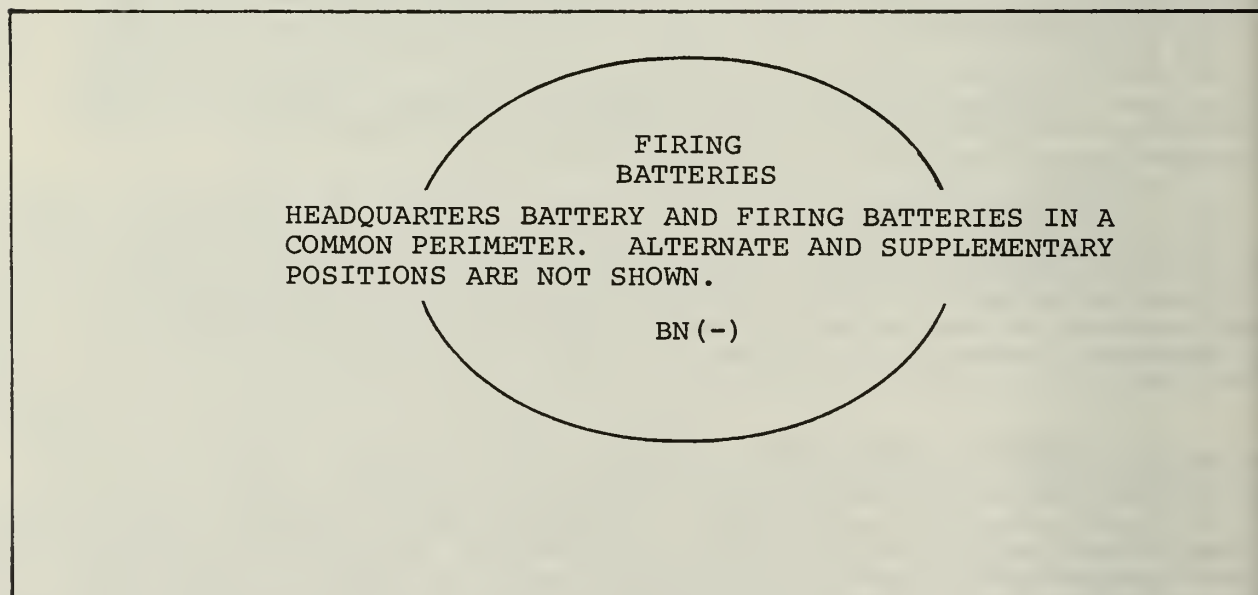


Figure 32.--Battalion Position Area (Method 1).



2 The principal disadvantages of method 1 are:

a Concentration of personnel, vehicles, and weapons in one area assists the enemy in detecting the position.

b A single nuclear weapon could destroy or neutralize the entire battalion.

c Displacement of the entire battalion may be necessary if the position is discovered.

d Repeated firing of weapons from the same positions may disclose the battalion's location.

(b) Method 2.--In method 2, the battalion occupies a position area (see fig. 33). The position area always includes the firing positions. The firing batteries and the headquarters battery are in separate perimeters. The firing batteries or other elements of the battalion displace as required by the tactical situation. The battalion commander selects or recommends alternate and supplementary positions to which the battalion or elements of the battalion can displace.

1 The principal advantages of method 2 are:

a Locating the firing batteries and the headquarters battery in separate perimeters reduces the possibility of the battalion being destroyed or neutralized by a single nuclear weapon.

b Enemy action against one element of the battalion may not require displacement of the entire battalion.

c Deploying the battalion elements in more than one area makes enemy detection of the entire battalion more difficult.

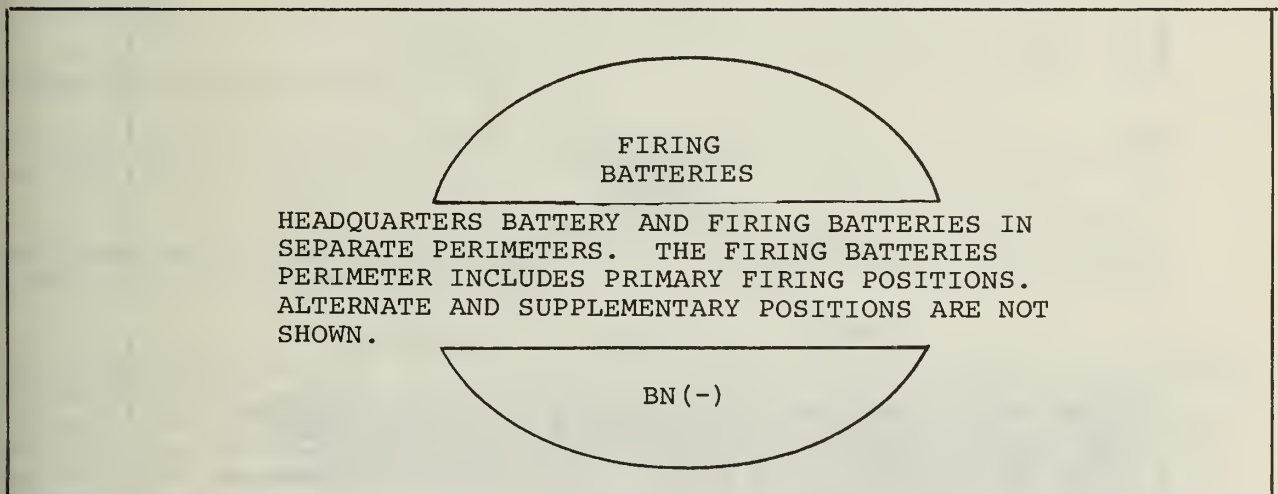


Figure 33.--Battalion Position Area (Method 2).

2 The principal disadvantages of method 2 are:

a Command, administration, messing, survey, communications, and local security are more complex than in method 1.

b The time and effort required for ammunition resupply to the firing sections are greater than in method 1.

c Repeated firing of weapons from the same position may disclose the locations of the positions.

(c) Method 3.--In method 3, the battalion occupies a position area (see fig. 34). The firing batteries and the headquarters battery are within the same perimeter. Priority is given to the establishment of unoccupied firing positions outside the common perimeter. These

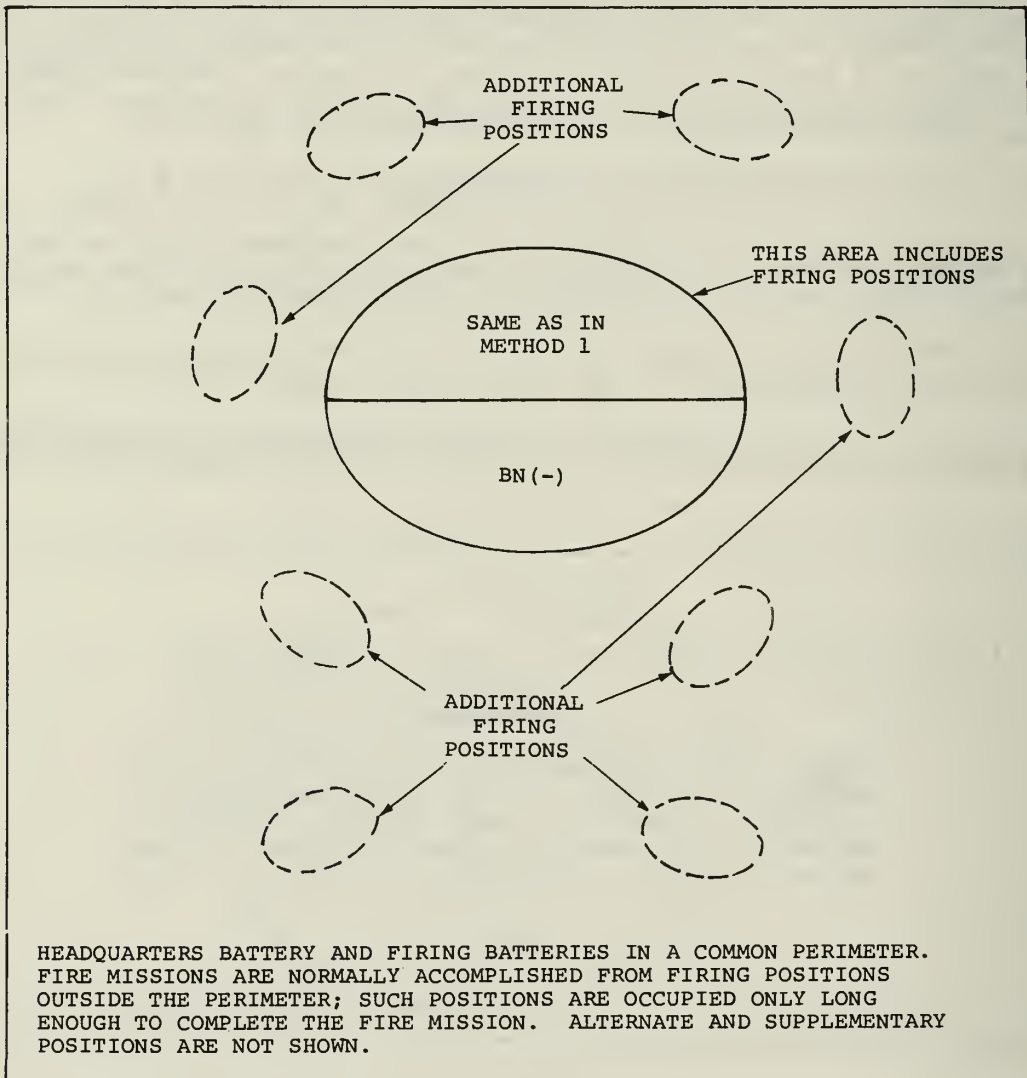


Figure 34.--Battalion Position Area (Method 3).

positions are selected to provide the desired fire capabilities. Time permitting, a firing position outside the common perimeter is used for firing a mission. The firing battery occupies the position only long enough to complete the fire mission and then returns to the battalion position area. Firing positions in the battalion position area are used only when conditions make it infeasible to fire missions from positions outside the area. The firing batteries or other elements of the battalion displace as required by the tactical situation. The battalion commander selects or recommends alternate and supplementary positions to which the battalion or elements of the battalion can displace.

1 The principal advantages of method 3 are as follows:

a Since elements of the battalion are together most of the time, command, administration, messing, and local security are simplified.

b Enemy detection of the firing positions outside the fire missions reduces the possibility of effective counterbattery fire against the firing elements.

2 The principal disadvantages of method 3 are as follows:

a Achieving the maximum rate of fire of an artillery battalion is difficult.

b A single nuclear weapon delivered on the battalion position area could neutralize the entire battalion.

c Survey and communications are more difficult than in methods 1 and 2.

d Firing batteries may be detected during displacements.

e Lack of suitable position areas, time, and routes may prevent use of this method.

f The requirement for providing sustained fire may prevent use of this method.

g If the battalion is required to fire from positions within the common perimeter, all the disadvantages of method 1 will apply to this method.

(c) Method 4.--In method 4, the battalion occupies a position area (see fig. 35). The firing batteries and the headquarters battery are in separate perimeters. The number of areas occupied by the firing batteries can be varied to meet the needs of the unit. One or more firing sections are located in each firing position. Additional firing positions are selected as necessary to provide the desired fire capabilities. The firing batteries initially are located outside the headquarters battery perimeter. Upon completion of a fire mission, the firing battery moves to another firing position. The firing batteries or other elements of

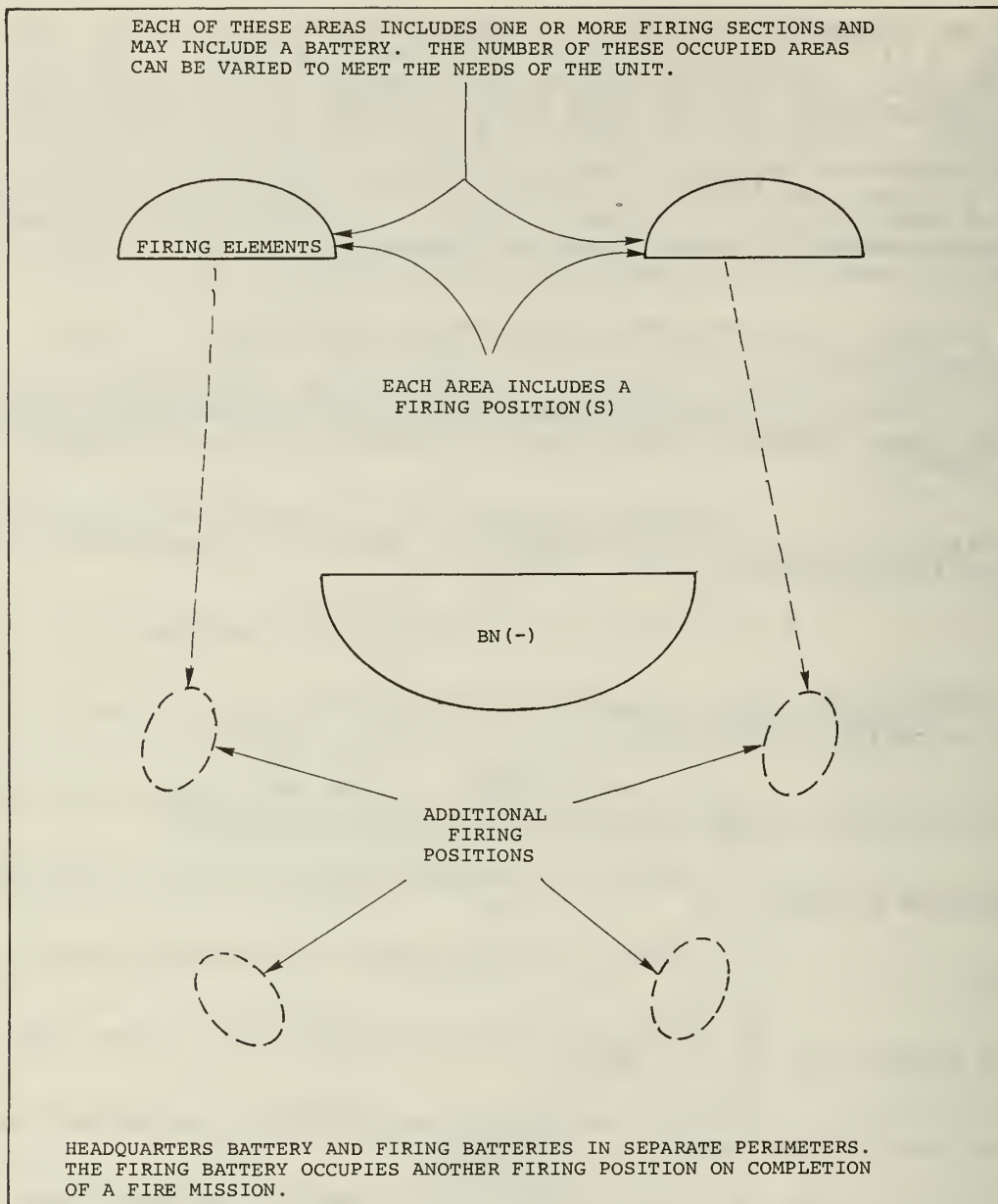


Figure 35.--Battalion Position Area (Method 4).

the battalion displace as required by the tactical situation. The battalion commander selects or recommends alternate and supplementary positions to which the battalion or elements of the battalion can displace.

1 The principal advantages of method 4 are as follows:

a Dispersion of battalion units provides the battalion with a high degree of passive defense against nuclear attack.



b Enemy action against one element of the battalion may not require displacement of the entire battalion.

c Dispersion of battalion units makes enemy detection of the entire battalion more difficult.

2 The principal disadvantages of method 4 are as follows:

a Command, administration, messing, and local security are more complex than in the other methods.

b Survey and communications are more difficult than in methods 1 and 2.

c Achieving the maximum rate of fire of the battalion is difficult.

d Firing elements may be detected during displacements.

e Lack of suitable position areas, time, and routes may prevent use of this method.

f The requirement for providing sustained fire may prevent the use of this method because considerable time and effort are required to resupply ammunition.

e. Locating and Displacing Elements

(1) When any of the methods described in paragraph d above are used, the headquarters battery elements may be located together or separately, depending on the desires of the battalion commander or on instructions from the artillery regimental commander.

(2) The authority to order intrabattalion displacement of the type peculiar to methods 3 and 4 usually rests with the battalion commander. The authority to order displacement to alternate and supplementary positions is an inherent aspect of the responsibilities of tactical missions.

(3) Artillery units must keep the appropriate fire support coordination center informed of the location(s) of all firing positions.

f. Observation Posts.--The battalion observation posts (OP's) are located to give the best possible coverage in width and in depth. The primary consideration in locating OP's is to insure complete observations over the artillery battalion's entire zone of fire.

g. Radar Positions

(1) The artillery commander designates the locations of the radar position area. The S-2 advises the commander on the location of the radar position area. The artillery commander designates an area large enough to permit selection of the actual radar site based on technical considerations affecting operation of the radar.

(2) The principal considerations governing the selection of a radar position area are maximum coverage of the zone of action of the supported unit, the technical capabilities and limitations of the radar set, and integration of the radar's zone of search with the zones of search of other radars as directed by the higher artillery commander.

(3) In the offense, the radar position should be well forward to avoid early displacement. In the defense, the general location of the radar position may be prescribed by the higher artillery commander to provide depth to the radar operations of the force. The proximity of the radar position to the area of search is determined by the technical limitations of the equipment. Other considerations in the selection of the position such as security, cover, concealment, and communications are the same as those in the selection of a firing battery position.

h. Orders for the Occupation.--Based on his reconnaissance, reports from members of his party and the scheme of maneuver of the supported unit or the plans of the reinforced unit, the battalion commander completes his plan. He then issues the battalion order to his party and his staff. The order is usually issued orally and in fragmentary form. The battalion commander designates the release point in his order. A representative is placed in charge of this point until the executive officer arrives.

#### 5505. DISPLACEMENTS

a. General.--Displacements normally include reconnaissance, selection, and occupation of position. An artillery unit must be prepared to deliver continuous supporting fires. Therefore, movement of the unit must conform to the plan of the supported or reinforced unit. The movement may be deliberate, or it may be hasty; for example, a hasty RSOP to support a fast moving attack. As in other types of RSOP, a standing operating procedure, a well-indexed terrain map, continuous fire planning, and liaison with the supported or reinforced unit are necessary to the success of a movement.

##### b. Planning the Movement

(1) General.--Planning for displacement should be continuous in order to insure fire support during an attack or during a retrograde movement. The method of displacement is the key planning factor.

(2) Special Factors.--Special planning factors usually include the following:

(a) When the battalion is displaced as a unit, the commander arranges for the transfer of his fire support responsibilities to another unit or units during the displacement.

(b) The ability to maintain communications with liaison officers and forward observers, and the characteristics of the terrain and tactical situation influence the distance and frequency of displacements.

(c) As a general rule, the distance of displacement should be at least one-third the maximum range of the cannons employed by the displacing artillery.

(d) Directional control may be brought into the battery areas by means of traverse, astronomic observation, or other artillery survey techniques. It is desirable to have fifth order horizontal and vertical control in the firing position. The chart location of the firing positions are obtained from a map and are used until better survey data become available.

(e) In a forward displacement, the battalion commander usually conducts the reconnaissance and selection of position. In a rearward displacement, the battalion executive, assisted by a reconnaissance party, may perform the reconnaissance and selection of position while the commander remains with those elements of the battalion still in position or goes where the situation is most critical.

(f) When two or more artillery battalions, not in a battalion group, displace over the same route, the higher (senior) commander coordinates the movement.

(g) When artillery must displace over a route used by units other than artillery, the force commander coordinates the movement.

(h) Except in operations involving nuclear employment, direct support field artillery has priority on roads before all other artillery.

(3) Planning for Employment From March Column.--The occupation of a position from a march formation requires detailed planning prior to the march so that personnel are alerted to the possibility and are aware of the requirements for a hasty occupation. Prior to the start of the march, selected artillery personnel are furnished with maps and/or photographs that show possible locations of installations and the control measures in effect. Forward observers and liaison officers are kept informed of this prior planning. Command liaison is established with the supported or reinforced unit.

#### c. Methods of Displacement

##### (1) Artillery in Direct Support

(a) General.--An artillery battalion in direct support displaces when the battalion commander considers displacement necessary or when ordered by the regimental artillery commander. The displacement is dictated by the scheme of maneuver of the supported unit. Continuous fire support must be maintained. When displacement is necessary, the battalion commander coordinates the movement of the battalion with the actions of the supported unit and establishes the method of displacement, the time displacement will begin, the expected time of completion, and the location of the new position area.

(b) Method.--An artillery battalion in direct support displaces by one of three methods. The method used depends on the time available, the scheme of maneuver of the supported unit, the availability of reinforcing artillery traffic conditions, and enemy activity. The three methods are discussed below:

1 When reinforcing artillery is available or when arrangements can be made for other artillery to assume the responsibility for the direct support fire missions, the battalion may displace as a unit.



2 The battalion may displace by echelon. When the battalion displaces by echelon, one firing battery and a portion of the headquarters battery move in one echelon and the remainder of the battalion in another echelon. The portion of the headquarters battery to displace with the forward echelon should be established by SOP. When the battalion displaces by echelon, close coordination between the commander and the executive is essential. The commander normally proceeds to (or remains at) the forward position area to supervise the occupation of position by the forward echelon. The executive normally remains with the battalion to supervise the movement from the old position. When the forward echelon has occupied its forward position and is ready to resume its fire support, the commander calls the second echelon forward by means of a pre-arranged code. If the situation requires that the battalion commander remain with the supported commander, the executive supervises the entire displacement.

3 The battalion may displace one battery at a time. The responsibilities listed in 2 above are applicable for this method. Advantages are that the unit is less vulnerable to attack and it is more difficult for the enemy to detect the movement. Disadvantages include the lack of control over displacing elements and the prolonged time required to move the entire battalion.

(c) Command Post.--There should be no interruption in the operation of the fire direction center when the battalion displaces by battery or by echelon. Continuous communications are maintained with the supported unit, reinforcing artillery, and higher artillery headquarters. The fire direction center displaces by echelon so that continuous massed fires can be delivered. Every effort should be made to establish communications between the advance command post and the supported unit prior to the displacement of the battalion; however, the lack of communications should not delay displacement.

(d) Continuous Support.--Firing batteries in support of marching troops may be positioned and moved successively to forward position (leapfrogged) in order to insure that some weapons are always in position and prepared to fire in support of the marching troops.

(2) Reinforcing Battalion.--An artillery battalion with a mission of reinforcing the fires of another artillery unit displaces upon request of the reinforced artillery unit or when ordered by the artillery regimental headquarters. The reinforcing unit is responsible for notifying the next higher artillery headquarters of the method of displacement, the time displacement is started, the time displacement is completed, and the location of the new position area.

(3) General Support Battalions

(a) General Support Mission.--An artillery battalion in general support displaces when ordered by the artillery regimental headquarters. A general support battalion normally displaces as a unit; however, if the situation demands, the battalion may displace by any of the methods used by a battalion in direct support. The battalion commander continually studies the situation and makes recommendations to the higher artillery commander concerning position areas, routes, and time of displacement.



(b) General Support Reinforcing Mission.--A field artillery battalion with a general support-reinforcing mission displaces when ordered by the artillery regimental headquarters, or upon request of the reinforced artillery unit, subject to the approval of the artillery regimental commander. In making recommendations to the higher commander concerning position areas, routes, and time of displacement, the battalion commander considers all elements of his mission. General support-reinforcing missions may be assigned to other units by the higher artillery commander while the displacement is in progress.

d. Execution of the Movement

(1) Movement to the Position.--The executive officer alerts the battalion for the move. When directed, he marches the elements to the designated release point.

(2) Disposition of Elements During the March.--The formation of an artillery march column for movement varies with the type of unit, the mission, and the tactical situation. Column formations for nonfiring units differ from those for firing units; column formations for artillery marching alone differ from those for artillery marching as part of a march column of a supported combat unit. The batteries should be disposed within the column to assist their entry into the new position areas with the one moving to the most distant position in the lead. The order of march should be such that no battery has to pass another in order to get to its new position area. There should be an adequate interval between serials of the convoy to achieve march dispersion and to eliminate the need to halt the entire convoy in the event of temporary delays of lead vehicles. The vehicles should be separated by a specified gap; 100 to 150 meters is recommended in order to minimize the effects of an enemy attack.

(3) Field Artillery Support for the Column.--When the enemy ground action halts the column, or when there are other requirements for immediate fire support, the artillery battalion commander directs the appropriate firing batteries to occupy hasty positions and prepare to fire. The remainder of the battalion remains with the column until otherwise directed. The artillery commander must never allow his unit to be in a situation where his firing elements cannot support the maneuver units.

5506. RSOP BY THE ARTILLERY BATTERY

a. General.--In this section, reconnaissance, selection, and occupation of position by the artillery battery will be discussed.

b. Battery Position Area.--The battery position area includes the firing position, the battery CP, and all other battery installations. The firing position is the location occupied, or to be occupied, by the elements of the battery which are essential for firing a cannon.

c. Battery Commander's Party

(1) The battery commander usually takes with him a small party to assist in the reconnaissance for battery positions and in planning the occupation. The composition and loading of the party is based on the initial tasks to be performed, the number of vehicles permitted, and the time available.

(2) The battery commander's task in getting his battery into position includes reconnaissance, selection of locations for battery installations, formulation of the occupation plan, issuance of orders to carry out the plan, and supervision of the execution of the plan. The area should be reconnoitered in detail, and security should be organized immediately. When time is a limiting factor, the battery commander should appoint members of the party to perform portions of the reconnaissance. The position for an installation may be selected by an appointed member of the party, but the final selection should be approved by the battery commander.

(3) It may be desirable to include one cannon and crew in the party so that registration can be conducted and the firing chart started before arrival of the battery. This is particularly advantageous when the position is to be occupied at night and fires are to be delivered before daylight, and when there is no restriction on registration.

d. Planning the Reconnaissance.--In planning a reconnaissance, the commander considers the following:

(1) Distance and route to the new area.

(2) Personnel available to conduct the reconnaissance and additional personnel required.

(3) Vehicles and equipment required for the reconnaissance and for early preparation of the position (wire, tentage, and fire direction equipment).

(4) Locations for the base piece communications; ammunition; petroleum, oils, and lubricants (POL) facilities; and when required, the nuclear weapon exclusion area.

(5) Time available.

(6) Tactical situation.

(7) Siting requirements for electronic security purposes.

e. Receipt of Order

(1) Before he leaves the battery to report to the battalion commander for the movement orders, the battery commander issues instruction covering operations during his absence. When the battery commander and his party arrive at the appointed place to meet the battalion commander, he halts his party, directs dispersion and concealment, and reports to the commander.

(2) The order for movement generally follows the sequence of other operation orders and includes the situation, time of movement, order of march, administrative arrangements, communication instructions during march, and other appropriate or special instructions.

f. Executing the Reconnaissance

(1) After receiving the battalion movement order, the battery commander assembles his party, explains the situation, and proceeds to the

new area. On the way, he notes the condition of the route and the number of route markers required. Included with the reconnaissance party will be personnel designated as a security element who will search the new position area as directed by the battery commander or his designated representative--usually the first sergeant.

(2) When the battery commander arrives at the proposed battery position area with his party, he first determines the direction of fire on the ground; then he begins his reconnaissance to select positions for battery installations. He should personally select the firing positions for the cannons. These positions are normally selected before any other part of the reconnaissance is performed.

(3) The battery commander formulates his plan for the occupation as he performs his reconnaissance of the battery position area. After the reconnaissance and selection of positions are completed, he issues his orders for the occupation to the members of his party. The orders include:

(a) General Instructions.--The battery commander points out the location of the base piece or battery center, the direction of fire, and the locations of other elements of the battery. He gives instructions concerning the method of laying, ammunition storage, camouflage, routes into and out of the position, and tentative positions for perimeter defense weapons.

(b) Communication Instructions.--The battery commander points out the locations of the battery fire direction center, the command post, and the switchboard, and gives the necessary orders for the installation of the battery communication system. When necessary, he gives the communication chief detailed instructions concerning wire lines that must be laid outside the battery area, or any radio relay that must be established.

(4) If the party consists of only the battery commander and the first sergeant, the battery commander usually shows the first sergeant the area to be occupied by battery headquarters. The first sergeant selects the locations for battery installations. Before leaving the area or issuing his orders, the battery commander receives the first sergeant's recommendations for the locations of battery installations and considers them for use in his plan.

(5) After receiving the battery commander's instructions, the reconnaissance party rapidly prepares for the arrival of the battery. Cannon marking stakes are emplaced for individual piece alignment and positions, trail pits are dug when required, the aiming circle is set up and oriented, auxiliary aiming posts are set out when directed, and initial readings to the marking stakes are read and recorded. The wire net is installed, and guides are designated to direct each vehicle to its proper location upon arrival of the battery from the battalion release point.

#### g. Planning the Occupation of Position

(1) A guide should lead each vehicle to its parking place, especially during darkness. The use of guides expedite the movement of vehicles from the column to their proper locations in the battery area without halting the column or delaying the prompt clearance of the road.



If personnel are not available or if the time of occupation is uncertain, locations may be marked by signs. If signs are used, security must be considered.

(2) Separate entrance and exit routes are desirable. When available, established roads and trails should be used. The entrance to the bivouac area of the headquarters battery should be located so that battery vehicles do not pass through the command post area.

#### h. Displacement

(1) The battery normally displaces on order of the battalion commander. When the battery moves as a part of the battalion, march column control is usually exercised by the battalion executive officer, who announces the start point, the order of march, the rate of march, the distance between vehicles and units, and the release point. Security measures to be taken on the march and upon arrival at the new position should be prescribed in the battery SOP.

(2) At times, the battery commander may control the displacement. When he does, the essential elements for control of the column either must be a matter of SOP or must be announced.

(3) The formation of the battery column may vary depending on the tactical situation and the position area to be occupied. In areas where the possibility of enemy attack is great, it may be advisable to disperse the cannons throughout the column. In most other situations, cannons and control vehicles should be placed well forward in the column to allow rapid entry into position. If possible, the commander should communicate to his executive officer the order of march to allow the section located farthest from the entrance to be positioned closest to the front of the column. The heaviest and slowest moving vehicle should be at the front of the column.

#### i. Occupation of Position (Day)

(1) The actual occupation of the position must be thoroughly planned. The battery is extremely vulnerable during the occupation phase of an RSOP; therefore, this critical phase must be completed quickly.

(2) When the battery arrives at the position area, all vehicles should be moved off the road into the position area without halting the vehicles or closing the interval between vehicles. A guide should lead each vehicle to its predetermined location. As soon as the vehicles have been unloaded, they should be guided to the vehicle dispersal area or to another designated point. Ammunition vehicles are brought into the firing position only when ammunition is to be unloaded. Equipment should be unloaded quietly, quickly, and in an orderly manner. Noise should be held to an absolute minimum especially when commands for laying the battery and other instructions are being given in preparing the firing elements for delivery of fire.

#### j. Occupation of Position (Night)

(1) Practice in night occupation of position is necessary to insure smooth operation. When time and the situation permit, the executive officer accompanied by the battery gunnery sergeant, the section chiefs,



and the prime mover drivers should conduct a daylight reconnaissance. The reconnaissance should include the reconnaissance of the primary position area including the routes into and out of the area, the alternate position area, and if possible, the supplementary position area. The number and location of route markers required and their locations should be determined, and plans for security on the march and in position should be established. Night occupation of position is aided when adequate guides are made available. Guides should know the location of each installation in the area. At the conclusion of the reconnaissance, all key personnel, including drivers, should be briefed. During a reconnaissance prior to a night occupation, section marking stakes are employed to mark the position of the panoramic sight of each piece, of each instrument used in laying for direction, and of each aiming post. A marking stake is also employed for orienting the instrument that establishes direction. An identification tag, with lettering large enough to be read under blackout conditions, is attached to each stake. Night occupation is also aided by accomplishing certain other tasks during daylight. Some of these tasks are:

(a) Emplacing auxiliary aiming posts.

(b) Laying wire. (This may include laying two "hot-loops" prior to darkness--the firing battery "loop" and the perimeter "loop.")

(c) Digging parapets, ammunition pits, trail pits, and foxholes.

(d) Preparing the command post and the battery fire direction center.

(e) Installing field expedient night lighting devices on auxiliary aiming posts.

(2) When fire control instruments are used at night, it is often difficult to determine the correct reference light on which to sight. Linking the light in accordance with prearranged signals or using colored lights aids in identification of the correct light. Only those lights actually in use should be on. In laying the battery at night, the executive officer should keep his instrument sighted on one piece until it is completely laid.

(3) A marker equipped with a light should be emplaced to mark the end of the orienting line. This marker should be placed at a sufficient distance to eliminate the possibility of parallax in the aiming circle.

(4) A night occupation requires more time than a daylight occupation. In addition, there is an even greater need for order and efficiency in a night operation. No attempt should be made to hasten the operation until all personnel are capable of performing their duties in darkness. Particular care is necessary in guiding vehicles during blackout. Immediate corrective action must be taken to overcome violations of light and sound discipline.

(5) Rapid displacement and night movements make it imperative that each unit prepare a loading plan for a uniform system of loading and

unloading equipment. The weapon position should be so organized that each man knows where each item of equipment is located at all times.

(6) Current night lighting devices on aiming circles and weapons sights provide adequate light for night operations.

(7) Flashlights or expedients should be masked to prevent a breach of light discipline. Current active and passive night vision devices should be used whenever possible. These aids assist in the handling of ammunition, servicing of weapons, maintenance of communications, and the conduct of survey. Should daylight reconnaissance be impossible, maximum use of night vision devices is essential.

k. Occupation of Position Without Prior Reconnaissance.--In some situations, time is limited and a rapid occupation of position will be required. The procedures discussed in paragraphs (1) through (7) below apply to a rapid occupation of position.

(1) Decentralization of Duties.--In a rapid occupation of position, decentralization of duties is essential. Personnel must be capable of performing their duties with little or no supervision. Personnel must continually practice the standard operating procedures involved in rapid occupation of position to require proficiency.

(2) Continuous Reconnaissance.--Normally, the battery commander precedes the battery. He constantly reconnoiters for possible position areas and reports the results to the battery executive officer. The executive officer notes and records the positions' locations and is prepared at all times to occupy the nearest suitable position in the event a fire mission is received.

(3) Codes and Signals.--The unit SOP should specify certain codes and signals which can be used to order the battery into position and to direct the occupation, thus eliminating lengthy orders and instructions.

(4) Occupation of Position.--When directed, the executive officer leads the battery into the nearest position. The unit SOP should provide a means of designating the position for the base piece and the location of the battery center or the general area for the sections so that each chief of section can select the specific location for his own piece. The prime mover or ammunition vehicle should remain by the piece. Ammunition should be taken directly from the vehicle until the vehicles can be unloaded. Tactical considerations may require firing prior to making sight tests and adjustments. In such cases, pieces must be boresighted when the opportunity presents itself during a lull in firing.

(5) Laying the Battery.--The executive officer is responsible for laying the battery; however, the battery may be laid by another designated individual.

(6) Fire Direction Procedure.--During the march, the executive officer should trace the route on his map so that after occupation the battery position can be quickly determined by map inspection. As soon as the fire mission is received, initial firing data is determined and sent to the firing sections. Initially, the battery fire direction center should be set up close to the cannons so that fire commands can be relayed by voice.

Fire direction center personnel should be trained in emergency procedures to expedite the delivery of fires.

(7) Organization and Improvement of Position.--After the fire mission has been completed, continuous action is taken to organize and improve the position. Any inaccuracies in laying or boresighting are corrected. Communications within the battery are installed and the normal installations are established.

1. Battery Operating Independently

(1) General.--When the cannon battery operates independently as in support of a battalion landing team, the battery commander, in addition to his normal duties, assumes the appropriate responsibilities of battalion commander.

(2) Reconnaissance and Selection of Positions.--When a battery is operating alone, the battery commander performs the initial reconnaissance for position areas. After an area is selected, the occupation procedures are similar to those of a battery operating as part of a battalion.

(3) Observation.--The observation functions performed by a battery operating alone are similar to those performed by a battery operating as a part of a battalion.

(4) Liaison.--When a battery is employed independently, liaison is performed as required by the tactical mission.

(5) Survey.--Personnel required to accomplish the necessary survey may be attached from the battalion survey section.

(6) Communications.--The communication section chief supervises the installation and operation of all wire and radio communication facilities. His duties are similar to those of the battalion communication officer. Communications with the supported or reinforced unit is of primary importance and must be maintained.

(7) Fire Direction.--The battery fire direction officer supervises the battery fire direction center. The fire direction center is organized so that multiple missions can be fired by the battery. All radio-telephone operators should be able to act as recorders, and FDC personnel should be trained to act as computer and chart operators. If the battery displaces by echelon, it will be necessary to set up an FDC in the new area and to maintain the FDC in the old area.

(8) Supply and Ammunition.--When the battery is operating independently, the battery responsible officer performs the supply functions normally performed at battalion.

5507. RSOP BY THE HEADQUARTERS BATTERY

a. General

(1) In this section, reconnaissance, selection, and occupation of position within the command post area and the various installations that are included in the headquarters battery will be discussed.



(2) The latitude allowed the headquarters battery commander in positioning the elements of his battery and the extent to which he can develop an SOP depend on the following:

(a) Echelon Involved.--At battalion level, the staff sections have few subdivisions that require locations; for example, all S-2 functions are performed in one place.

(b) Policy of the Commander.--Normally, the battalion commander directs the headquarters battery commander to organize the CP area. The headquarters battery commander may be required to obtain approval of his plan prior to the organization, or he may have complete authority. The initial reconnaissance may be made by the communication officer, who will select tentative locations for the various installations. Both the communication officer and the headquarters battery commander must know the desires of the commander.

(c) Staff Section Requirements.--The headquarters battery commander and the communication officer should know the type of location required by each element to insure efficient operation and should understand the relationship among the various elements of the CP.

(3) After an SOP has been developed, the same general layout of the CP should be used in each position. Using the same arrangements of installations results in greater efficiency of operation.

b. Receipt of Orders.--The headquarters battery commander receives his orders at the same time that orders are issued to the firing battery commanders.

c. Characteristics of Position Areas.--In planning the organization of the position area, the headquarters battery commander and the communication officer consider the following requirements:

(1) Space.--Except as varied by the policies of the commander, the space requirements for the CP may depend on the organization of the fire direction center and on the number of additional personnel that must be accommodated. If specialist teams are attached or if separate locations are required for some installations and activities, a larger area will be necessary. In evaluating the space available, the battery commander and the communication officer consider the location requirements for:

- (a) The operations and fire direction section.
- (b) The message center.
- (c) The switchboard.
- (d) The remote radio positions.
- (e) A vehicle dispersal area near the message center for visitor traffic.
- (f) Battalion supply, maintenance, and ammunition (if applicable).
- (g) Headquarters battery elements.



- (h) Security and perimeter defense elements.
- (i) The battalion headquarters support section.
- (j) Medical section.
- (k) Mobile electric power generating sources.

(2) Cover and Concealment.--The area should have sufficient defilade to minimize visual or radar observations by the enemy. Heavily wooded areas provide concealment, but good locations for remote radio positions may not be available. In areas of sparse or scattered vegetation, camouflage is necessary. In open terrain, such as desert, elements in the CP area should be dispersed in such a manner as to conceal the installation.

(3) Security.--The area should be such that the defense can be organized with the weapons and personnel available. If possible, the command post should be located to derive some protection from the security measures of the firing batteries. Arrangements should be made for mutual protection with adjacent units.

(4) Battery Headquarters Area.--The location of the CP; the tactical situation, security, supply, sanitation; and accessibility govern the selection of the battery headquarters area. The area should have good drainage and concealment and should offer adequate space for a vehicle dispersal area and maintenance facilities. The sections of the battery should be grouped together for administration and control.

d. Executing the Reconnaissance.--The battery commander's party may be divided into two groups, one to perform the reconnaissance for the CP area and the other to reconnoiter the area for the battery headquarters sections. Normally, only the position for one major section need be designated. The other section can then be located according to their functional relationship with the major section. This procedure should be included in the battery SOP.

e. Planning the Occupation

(1) General.--After selecting locations for the various sections of the CP and verifying the plan for organization of the area, the headquarters battery commander and the communication officer plan the occupation.

(2) Equipment.--It may be desirable to move and install a certain amount of equipment prior to the occupation. Such equipment will consist primarily of facilities for shelter and local communication equipment. For example, the fire direction center should be able to move into the area, occupy the position, and begin operations without delay.

(3) Route Markers.--When the battalion CP and the battery headquarters move as part of the same march unit, as they frequently do, route markers are usually provided for in the orders of the battalion commander. When the CP element displaces alone, the headquarters battery commander is responsible for providing route markers.

(4) Coordination.--Because all headquarters staff elements are affected by displacement of the headquarters battery, the general plans for movement to and occupation of the new area should be coordinated in advance with the battalion executive officer.

f. Displacement of the Battery

(1) General.--The method and details of displacement are prescribed by the higher commander either in an SOP or in specific orders for each movement.

(2) CP Displacement.--The battery commander should, at all times, know the capabilities of the headquarters battery to move the CP. If for any reason the command post cannot be moved in one echelon, he should inform the battalion executive officer and recommend a method of displacement. When a move is imminent, he should be prepared to make recommendations before the commander's plans are made. Therefore, he must be kept informed of all contemplated movements. When the CP displaces by echelon, each staff officer is responsible for the section under his control. He informs the battery commander as to the number of personnel, the amount of equipment, and the persons in charge of the subdivisions in each echelon.

(3) RSOP.--Reconnaissance, selection, and occupation during the displacement is again accomplished as described in the preceding paragraphs of this section.

(4) Movement by Echelon

(a) Transportation.--Certain vehicles should be designated to displace and remain with each echelon. These are primarily the command administrative vehicles needed at each location. Other vehicles remain at the advance CP or may return to assist in the displacement of the rear echelon.

(b) Mess.--Provisions must be made for messing the personnel of each echelon. When the time interval between the displacement of echelons is short, emergency rations may be issued to the echelon containing the fewest personnel. When the time interval is more than 24 hours, provision should be made to provide personnel in both echelons with hot food.

g. Occupation of Position

(1) The battery commander may issue his orders for the occupation to the members of his reconnaissance party, or he may return to the headquarters battery before issuing his orders. When it is necessary for him to return to the battery, he may leave the first sergeant in the new area. On returning to the battalion headquarters from the reconnaissance, the battery commander reports the results of his reconnaissance and gives his plan for the movement and occupation to either the battalion executive officer or the staff officer in charge. The executive officer or the staff officer in charge issues instructions to the staff sections in conformance with the approved plan. The battery commander then assembles the key personnel of the battery and issues his orders.

(2) The battery commander may assemble certain personnel from the staff sections and headquarters battery and proceed to the new area in advance of the main column. This party should include route markers and sufficient personnel to prepare the new area for occupation. A staff officer may be designated by the battalion commander to lead the main column.

## Section VI. ORGANIZATION OF POSITION

## 5601. HEADQUARTERS BATTERY

a. General.--Organization of the positions of the various elements of the headquarters battery starts with the battery commander's plan. Improvement continues as long as the unit remains in that position. No standard plan or organization can be prescribed that will be applicable to all situations. However, the practices developed from experience and theory may be used as guides. The priority for location of each element of the battery is usually determined by the battalion commander and prescribed in the SOP.

b. Battalion Command Post.--The command post is the headquarters of the artillery battalion commander. It is here that the commander, assisted by his staff, performs his administrative and tactical command functions. If it is necessary to echelon the headquarters, the forward echelon includes the command post. Intelligence and operations are the primary staff functions involved in the operation of the command post.

c. Battalion Command Post Area

(1) General.--The locations selected for the command post sections depend on the size of the area, the method of positioning to be used, the guidance of the commander and his staff, and the requirements for coordination between the elements. The general arrangement should be such that visitors arriving at the CP will first pass through the message center visitor control area. Traffic within the CP area should be held to a minimum and be strictly controlled. Vehicles entering the area should be stopped at a dismount point, usually located near the message center, and then directed to the vehicle dispersal area. Vehicles that must enter the CP area should be restricted to prescribed routes. Foot movement within the CP should be restricted to prescribed trails or paths. Typical CP layouts for a battalion and a regimental artillery command post area are shown in figures 36 and 37.

(2) Commander.--The battalion commander usually is located in the vicinity of the fire direction center. The executive officer and the sergeant major should be located near the commander.

(3) Fire Direction Center.--The FDC should be located in an area which is outside the normal traffic lanes of other CP activities. This installation should be marked to indicate that only authorized personnel may enter.

(4) Message Center.--The message center should be located at the entrance to the command post area so that it will be readily accessible to incoming messengers and visitors. Adequate space for vehicle dispersal should be available.

(5) Switchboard.--The battalion switchboard should be located so as to facilitate the installation of wire circuits. It should be located on the perimeter of the command post area in a covered and protected area away from noise and interference. The importance of the switchboard renders it a particular target for infiltrating enemy; consequently, it must be well protected.



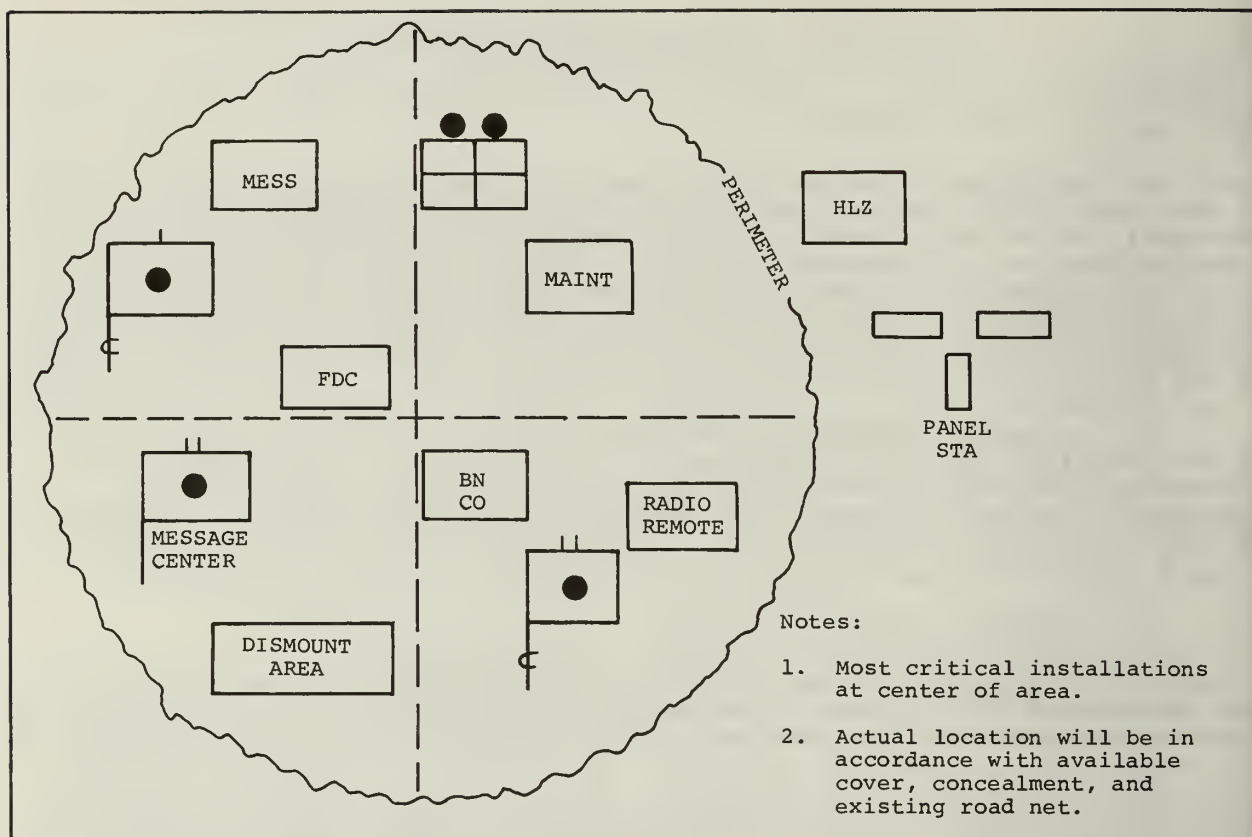


Figure 36.--A Typical Battalion Command Post Area.

(6) Communication Center.--This center consists of the communication facilities for the command and fire direction net, a panel display area, and a message pickup field for either fixed-wing aircraft or helicopters. The communication center should be located some distance from other installations, but still within view and protection of the defensive perimeter. The location should provide concealment for radio sets, vehicles and personnel. Antennas should be dispersed and placed so that the maximum amount of electromagnetic radiation emitted in the direction of the enemy is absorbed by terrain and foliage. There should be sufficient open terrain to permit the display of panels and the operation of the pickup field. As the organization of the command post progresses, remote control should be established from the radio sets to the FDC.

(7) Aid Station.--The battalion aid station should be located near a road or trail to assist in the rapid reception and evacuation of patients.

d. Battery Headquarters Area.--The battery headquarters area is organized to give maximum support to the command post. In organizing the area, the battery commander considers the following requirements:



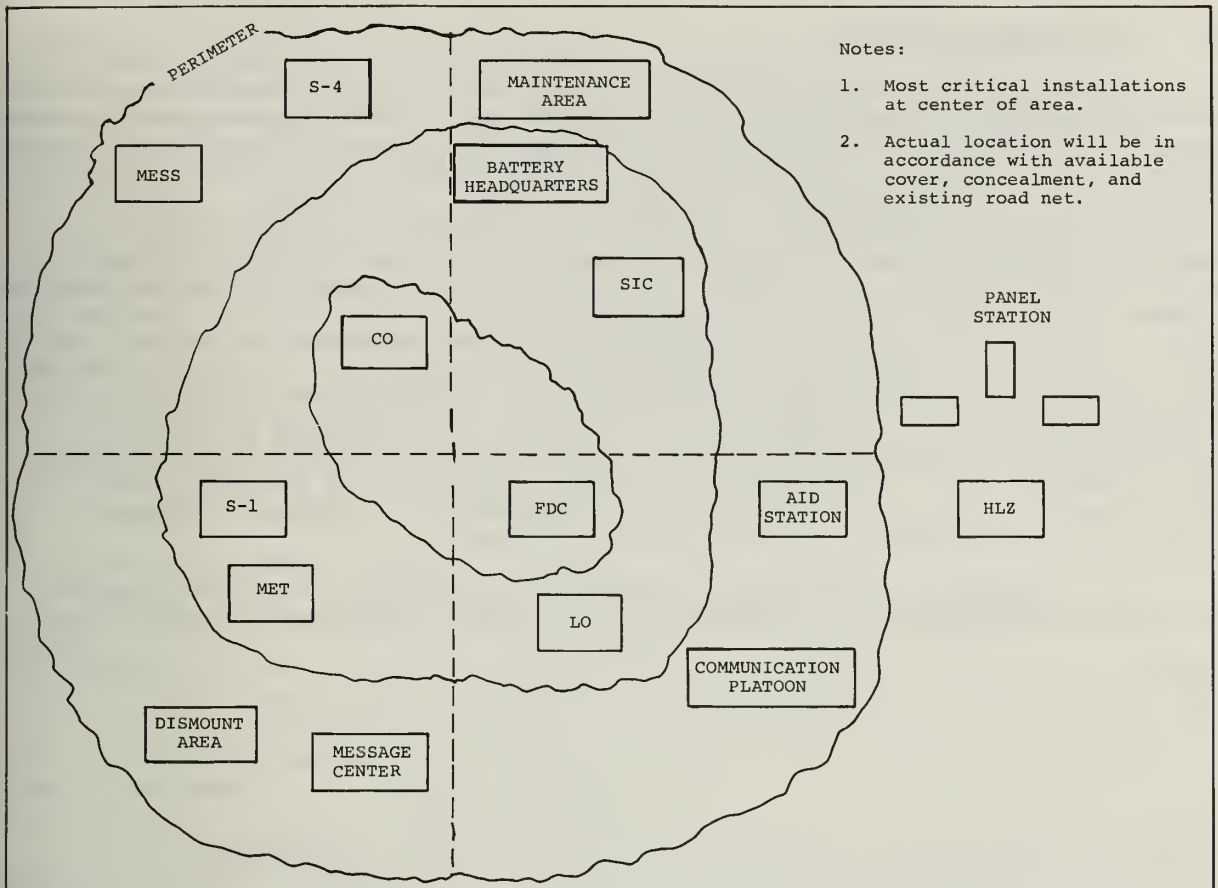


Figure 37.--A Typical Regimental Artillery Command Post Area.

(1) All personnel assigned to the same CP element should be quartered together. The staff officer who supervises the element, in cooperation with the battery commander, usually assigns personnel to shifts for 24-hour operation. The battery commander is responsible for insuring that the assigned personnel are available for duty at the required times.

(2) A route from the dismount point to the vehicle dispersal area should be prescribed as a security measure and also to avoid confusion. It is desirable to install a local telephone circuit from the switchboard to a control point within the vehicle dispersal area.

(3) The mess facilities should be located in the battery headquarters area and should be easily accessible to the CP area. The facilities should be located near a road to facilitate supply and resupply.

(4) The defense of the battery headquarters and CP areas is generally the same as that of firing batteries. The security of the battery headquarters is integrated with that of the CP.

## 5602. ARTILLERY BATTERY

a. General.--Organization of an artillery battery position consists of the operations necessary for delivery of fire. The cannons must be deployed to provide fire support for the supported force at all times. Organization of the position area is a continuous process that begins when the position area is selected and ends when the area is vacated. Organization of a position is divided into two phases--the operations necessary for immediate and continuous delivery of fire and the operations necessary to improve the position. The first phase often can be accomplished during the reconnaissance, selection, and occupation of position. When the situation permits, the battery commander should infiltrate personnel into the battery position area to accomplish as much of the organization as possible before the arrival of the main body of the battery. This may include the erection of camouflage nets, installation of wire nets, improvement of routes, organization of local security posts, employment of warning devices, and partial digging in. After the battery has occupied the position area, improvement of the area continues as firing permits. Figure 38 shows a typical position area for an artillery battery.

b. Planning.--The battery commander should plan the organization of the battery position area as soon as possible after the area has been

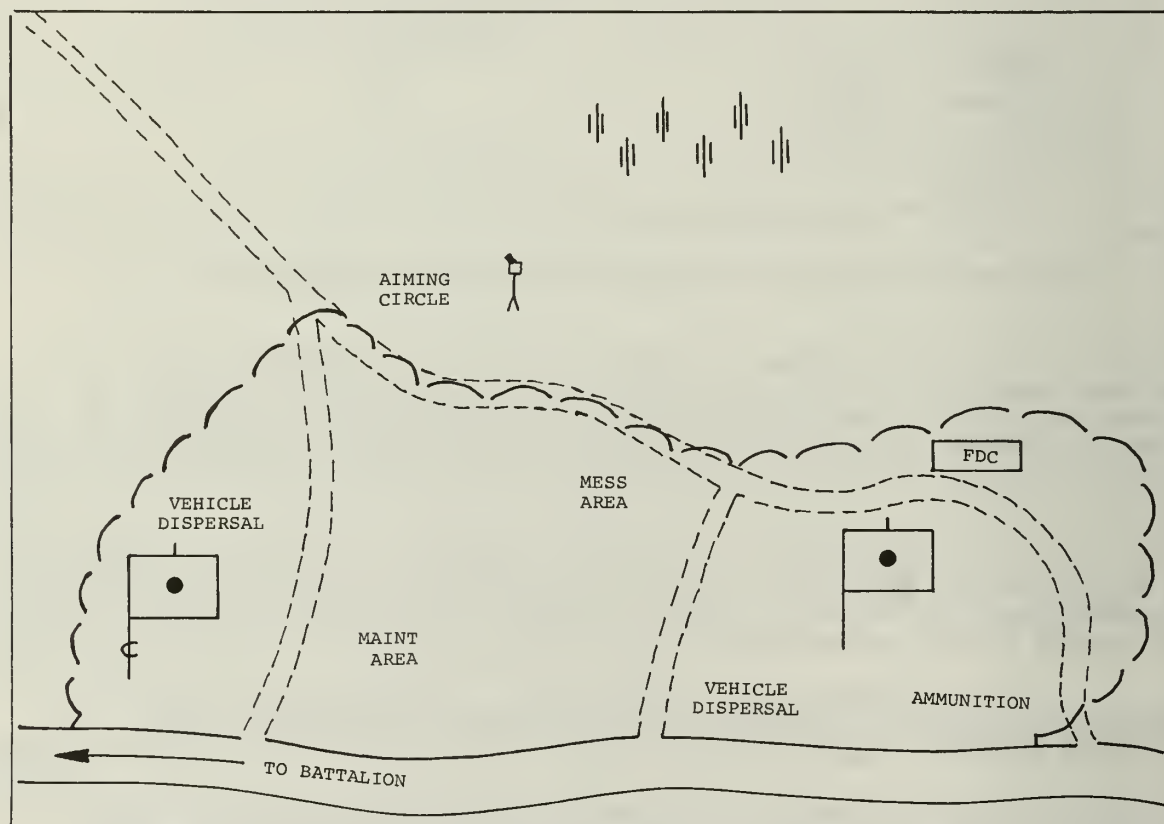


Figure 38.--A Typical Position Area for an Artillery Battery.

selected. In planning the organization, he must consider the unit's ability to execute its primary mission, the defense of the area, the effect that changing weather conditions will have on the area, the concealment and cover, and in counter guerrilla operations, the possibility of insurgent activity in the area. Maximum preparation prior to occupation will assist the commander in organizing the position.

c. Priorities.--The following order or priority for accomplishing the tasks associated with the organization and improvement of the position area may be established:

- (1) Preparation to deliver fires.
- (2) Establishment of a perimeter defense.
- (3) Protection of personnel by digging trenches or foxholes.
- (4) Protection of ammunition.
- (5) Camouflage.
- (6) Preparation of emplacements for the cannons and other weapons.
- (7) Preparation of alternate and supplementary positions.
- (8) Preparation of dummy positions (when authorized by the higher commander).

d. Installations.--The installations within the battery position area include the firing position, battery headquarters area, and perimeter defense. The arrangement of the different installations of the battery depends on the available fields of fire, possibilities for defilade and concealment, and layout of the firing position. Wide variations may be necessary to fit the existing terrain. For example, in the organization of a position area in the desert, greater emphasis is placed on dispersion and camouflage. The organization of a position area in or near a village will differ greatly from that of a position area in an unpopulated area.

e. Firing Position of the Artillery Battery

(1) General.--The firing position includes the installations around which the entire battery position area is organized; i.e., the emplaced cannons, the aiming circle(s), the ammunition dump, and the battery fire direction center. Selecting the locations for and preparing these installations have priority over all other tasks.

(2) Cannon Positions.--The primary consideration in selecting the locations for the cannons is the capability of firing effectively in support of the supported force. Some of the pieces may be moved from their initial positions in order to achieve more effective organization for prolonged occupation. Some of the factors to be considered in organizing the firing position are as follows:

(a) Terrain.--When possible, a position should permit a 6,400-mil firing capability. A position should provide defilade without creating an excessive minimum elevation. If weapons are positioned too



close to a high terrain mask, they cannot be used for direct fire against enemy ground forces attacking the battery position area. Although most cannons are capable of firing high-angle fire, high-angle fire may be undesirable or impossible--undesirable because of the time required for the delivery of high-angle fire at the close ranges and impossible because the range is too short. Terrain features to the flanks and rear of the battery position should also be considered. For instance; hills, cliffs, and high trees to the flanks or rear may adversely affect an otherwise excellent firing position. Trafficability of the terrain must be considered. Entrance and exit routes should be available.

(b) Tactics and Capability of the Enemy.--The tactics and capability of the enemy and the influence of terrain are interrelated. For example, when the enemy has air superiority or is active in counter-battery fire, or when the area is barren desert, the weapons and other battery installations should be widely dispersed. When the battery is operating in mountains or heavily wooded areas, when friendly forces have air superiority, or when the battery is harassed by guerrilla or infiltration tactics, the battery installations will usually be kept in a compact, easily defended area away from woods which might offer the enemy concealed routes of approach.

(c) Formation of the Cannons.--The formation of the cannons in the firing position is influenced by the terrain and by the tactics and capability of the enemy. Individual weapon positions are selected to obtain maximum cover, concealment, and dispersion consistent with control and the ability to deliver all-round fire. A compact firing position facilitates control by the executive officer and is easier to defend during ground attack. However, a compact position may be vulnerable to air attack and to counterbattery fire. A straight-line formation of cannons presents an easy target for strafing or low-level bombing attacks and should be avoided. Staggering the cannons helps conceal the position and provide better possibilities for firing to the flanks and rear. Three suitable cannon formations are the triangular, hexagonal, and star formations. A good dispersion pattern is maintained in each formation regardless of the direction of fire. Generally, battery fronts, on line or staggered formations for light and medium cannons, are 150 and 250 meters, respectively; for heavy cannons, 240 and 285 meters. If the frontages are exceeded, either the sheaf will be so wide that it will be less effective, or additional corrections may be required to close the sheaf on each fire mission. Pieces are numbered from right to left and from front to rear.

(d) Preparation of Emplacements.--The purpose of a cannon emplacement is to provide cover for the cannon and its crew and its ammunition. Improvement of the cannon emplacements continues throughout the occupation of position.

(e) Preparation For a 6,400-Mil Capability

1 In attempting to secure a 6,400-mil firing capability for the battery, the battery commander must not lose sight of the primary direction of fire and the mission. For instance, emplacing the weapons in a circular formation may provide the best all-round firing capability, but the effect of battery volleys will be considerably reduced by the irregular distribution of fire. Application of position corrections to each fire mission is not practicable. Therefore, weapons should be emplaced so that maximum effective fire can be delivered in the primary direction of fire. When i



is necessary to shift fire to a direction that causes the battery front to become significantly less than the battery depth, position corrections should be applied.

2 Actions that can be taken to provide a 6,400-mil capability without reducing the unit's ability to deliver fire with maximum effectiveness in the primary direction of fire are as follows:

a A second pair of aiming posts and/or an additional collimator (auxiliary) for each piece can be emplaced in a direction 3,200 mils opposite that of the initial pair of aiming posts or the collimator. The pieces will then have an aiming point for any direction of fire.

b When large shifts in direction of fire are required, the new azimuth of fire is announced to the pieces. Diagrams drawn on cannon shields or azimuth stakes may prove useful for reorientation purposes.

c Each cannon crew can place a stake beneath the sight of the weapon to minimize the aiming point or collimator displacement that results from large shifts in direction of fire. The sight of the weapon must be kept over the stake when the trails of a towed weapon are shifted.

d Gun emplacements can be constructed to provide an all-round firing capability in the delivery of fire.

e Constructing 6,400-mil charts.

f Circular, rather than cone-shaped, fire capabilities overlays can be used for fire planning.

### (3) Aiming Circle Location

(a) The aiming circle should be set up at a point from which all the pieces may be seen and easily laid. The location should be away from all magnetic attractions. A stake should be driven into the ground to mark the location of the aiming circle.

(b) The aiming circle must be set up no closer to the following objects than the distances indicated:

	<u>Meters</u>
High-tension power lines/electronic equipment	150
Railroad tracks and very heavy weapons	75
Medium and heavy weapons and armored vehicles	60
Light weapons, unarmored vehicles, and telephone wires	40
Barbed wire	10

(c) Steel helmets, small arms, steel-rimmed eyeglasses, rings, pencils, and other metallic objects which affect the needle must be kept away from the instrument.

(4) Ammunition Dump.--The ammunition dump (when authorized) should be located to the flank of the firing position and at least 100 meters from other installations. Dispersion, concealment, and cover are essential for passive protection. Defilade and good drainage are desirable. The various ammunition components such as fuzes, primers, powder charge increments, and projectiles should be stacked separately and by lot.

(5) Battery Fire Direction Center.--The battery FDC normally includes the fire direction officer or his representative (the battery operations chief), the computers, chart operators, and radio-telephone operations. Communications include radio and wire contact with the battalion FDC, wire lines to each cannon, and as time permits, a wire line to the battery switchboard. The physical location of the battery FDC can and should be varied to meet changing conditions. The location should provide defense against attack.

(6) Exclusion Area.--The nuclear weapon exclusion area should be located as near the center of the battery position area as possible, consistent with the availability of natural concealment and access routes.

(7) Safety.--Chiefs of cannon sections are responsible for the accurate setting of firing data on their cannons. During training, safety officers will assume the duties outlined in FM 6-40, Field Artillery Cannon Gunnery.

(8) Battery Command Post.--The battery command post is usually located in the general vicinity of the battery fire direction center. It should be connected with the battery wire system. Defilade and concealment are desirable.

f. Switchboard and Wire Lines.--The battery switchboard should be located to the flank of the battery near the point of exit of the exterior wire lines. It should be dug in, connected into the battery wire system, use available cover and concealment, and be free of noise. When time permits, wire lines leading from the switchboard and within the firing position that may be subjected to enemy artillery fire are buried. Alternate wire lines to all positions are desirable and will be established when time permits.

g. Service Area.--The service area contains the vehicle dispersal area and the battery mess. Since these installations are not directly related to the delivery of fire, they are located away from the firing position.

(1) Mess.--The battery mess (when authorized) should be in the battery position area when the situation permits. The mess should be placed in a defiladed and concealed location that is accessible by road. The area should have good drainage, and the soil conditions should permit absorption of seepage from sumps and garbage pits.

(2) Vehicle Dispersal Area.--The vehicle dispersal area should be located to the flank or rear of the cannons in an area that is accessible; has firm ground, good drainage, cover, and concealment; and provides room for dispersion of vehicles. When cover is not available, vehicles should be separated by a minimum distance of 50 meters. All vehicles that are not required at the various battery installations should be parked in the vehicle dispersal area.

h. Survey Operations.--The purpose of artillery survey operations normally performed by personnel of the headquarters battery is to determine the horizontal and vertical locations of points to be used in computing firing data and to provide a means for orienting weapons, instruments, and radar. Survey control in the position area of each cannon battery is the basis of accurate firing data. The position area survey requirements are identical for all artillery batteries. The survey party establishes an orienting line of known direction in the position areas of all batteries, computes an orienting angle for each battery unless otherwise directed by the unit SOP, and gives the information to the battery executive officer. Additional survey tasks may be prescribed for the survey party by the reconnaissance and survey officer.

i. Perimeter Defense.--The perimeter defense includes the positions for machineguns, antitank weapons, air defense weapons, other crew-served weapons, and sentinels, outposts, anti-intrusion devices, warning systems, and obstacles. The perimeter defense is established to provide a flexible, all-round defense of the position area.

## Section VII. DEFENSE OF THE BATTERY POSITION AREA

## 5701. DEFENSIVE POLICIES

a. General.--Artillery units must be able to engage in close combat and defend against air attack when necessary to accomplish their mission. Attacks against artillery in position can be expected and must be resisted. The mission of the artillery is to provide fire support to the supported maneuver force. Artillery will not withdraw from a position or fail to render fire support solely because of a threat of attack by hostile forces. Artillery withdraws only as part of a planned withdrawal and upon receipt of orders from the next higher commander. Traditionally, the artillery continues the mission and defends the weapons. Some of the defensive tactics and plans include:

(1) General Plan.--Each battery establishes a perimeter defense around its position. The perimeter defense includes dug-in positions for all machineguns and antitank weapons. Listening posts or outposts are established beyond the perimeter, and wire and radio communications are established with the firing battery command post to provide early warning. Under certain tactical conditions, contact patrols are used for maintaining contact with adjoining units. Obstacles such as barbed wire and minefields (when authorized) are constructed beyond hand grenade range of the perimeter to impede the enemy. An assembly point for the reaction (security) force is designated.

(2) Flexible Defense.--An all-round, completely integrated defense system is essential to the security of the battery. The following actions are taken to insure all-round defense:

(a) Primary and secondary sectors of responsibility are assigned to each crew-served weapon.

(b) The cannon positions are assigned and prepared so as to permit direct fire coverage of the entire perimeter.

(c) Fire plans are developed to cover all avenues of approach.

(d) A battery reaction force is formed and outposts are established as required.

(e) Automatic weapons, grenade and antitank weapons, and air defense weapons are located for most effective employment.

(f) A warning system is established to include the use of devices for early detection and an alarm system to warn of surprise attacks.

(g) Definite defensive positions are assigned to all personnel.

(h) Defense is coordinated with adjacent units for mutual support.



(3) Field Fortifications.--Construction of field fortifications should be initiated as soon as possible without delaying the delivery of fire. Bulldozers, if available, should be used to expedite the preparation of fortifications and to conserve manpower. Sandbags and salvage material, such as powder containers and ammunition boxes filled with sand, provide suitable material for revetments.

(4) Reaction Force.--Each battery forms a security force as an integral part of the battery defense plan. The security force should resemble an infantry rifle squad, both in size and composition. The security officer, designated by the battery commander, supervises the battery reaction force and insures that the force receives complete instructions, including the signal for and the place of assembly.

b. Sustained Fire Support.--An artillery battalion or battery operating independently should coordinate with adjacent artillery units and higher echelons to insure mutual support in sustaining artillery fire support during an attack on its position. An artillery battery must continue to fire support during an attack against its position. When necessary, some sections may continue the fire mission while the other sections place direct fire on the attacking enemy.

#### 5702. SECURITY

a. General.--The battery commander is responsible for the security of his unit. He should designate an officer as the battery security officer, who will assist him in all matters relating to the security of the battery by:

(1) Implementing the security plan. On the basis of the battery commander's selection of locations for the battery installations and his plan for defense, the security officer, assisted by the first sergeant, prepares a detailed plan for the battery defense system. He specifies the responsibilities of personnel at each machinegun and antitank weapon position and at other crew-served weapon positions; he also supervises the posting of the outposts, machineguns, and antitank weapons. He directs the preparation of an observation plan, giving particular attention to surveillance of approaches during periods of limited visibility or darkness.

(2) Coordinating the installation, marking, charting, reporting, and removal of warning devices, barbed wire, mines, and boobytraps. All such obstacles should be covered by the fire of cannons and/or automatic weapons.

(3) Supervising the installation of the nuclear weapons exclusion area if such an area is required.

(4) Coordinating the battery defense plan with adjacent units.

(5) Assigning specific defense missions to elements of the battery.

(6) Planning, organizing, and dispatching patrols as directed by the battery commander.

(7) Organizing and commanding the battery reaction force.

(8) Supervising the continuous improvement of the battery defenses.

(9) Submitting a plan for the battery defense system to the battery commander for approval and subsequent submission to the battalion executive officer.

(10) Conducting rehearsals of battery defense.

b. Security Outposts.--Security outposts may include machinegun, antitank weapons, and other crew-served weapon positions; listening posts; and observation posts. These outposts may be equipped with night observation devices and sensors and should be situated on commanding terrain which provides observation and coverage by fire over all routes of approach into the battery area. All routes of approach should be covered by warning devices or systems to alert the outposts of movement at specific locations. The outposts should be placed far enough from the defensive perimeter to permit the warning of attack to be given in time for implementation of the defense plan. If necessary, the more distant outposts may be withdrawn into or near the defensive perimeter at night. When time permits, the intervals between outposts are covered with barbed wire, obstacles, trip flares, and mines (when authorized). Outpost personnel must be thoroughly briefed on the location of friendly elements and advised of the movements of personnel, such as messengers, patrols, and wire crews. Communications between the outposts and the battery is imperative.

c. Listening Posts.--When outposts are withdrawn at night, listening posts are established on or near the perimeter of the defended area. Listening posts are located along avenues of approach in order to detect the sounds made by enemy personnel and equipment. They are positioned to facilitate night observation of silhouettes. They must be dug in, provided with communications, and covered by fire from within the position, and they should be protected by barbed wire or other obstacles.

d. Patrols.--Avenues of approach to the battery area and areas which might provide concealment or cover for enemy forces should be actively patrolled or kept under surveillance. Patrols should make personal contact with as many of the outposts along their route as possible without exposing either themselves or the outposts. Visual contact must be made with those outposts in exposed locations. When patrols locate enemy forces, they should not engage the enemy in a firefight unless absolutely necessary, but should keep the enemy forces under surveillance and notify the battery. Before outposts are reoccupied after dawn, the routes and positions should be checked by patrols for possible ambushes. Patrol activities are coordinated with other units in the area to prevent duplication of effort and the possibility of patrols firing at one another.

e. Communications.--Communications between the outposts, listening posts, and battery should be integrated into the battery switchboard by placing all the installations on one continuous wire circuit (hot loop). This system permits one outpost to alert the other outposts, listening posts, and battery simultaneously. Alternate methods, such as sound devices, pyrotechnics, and runners should be ready for use. When time permits, the wire lines should be buried and alternate lines provided to all positions. Radio communications normally are used by patrols and may supplement the wire communications to the outposts and listening posts.

f. Illumination

(1) Illuminating devices and pyrotechnics may be used advantageously when the battery is under attack at night. Plans for the use of illumination must be coordinated with higher headquarters.

(2) The use of illumination should be secondary to the use of night observation devices. Illumination should be employed only when necessary to repel a significant probe or attack.

g. Obstacles.--Obstacles are used to reinforce the outpost system and the main perimeter defense. Artificial obstacles may be used to supplement natural obstacles. Both must be covered by observation and fire to be effective. Mines, flame field expedients, trip flares, and barbed wire serve both as obstacles and as part of the warning system. Mines and booby-traps, other than those employed in protective minefields, may be used only when specifically authorized by higher headquarters. Unit minefields must be properly marked, recorded, and reported. Concertina or doubleapron barbed wire is used to cover avenues of approach and to protect the main perimeter defense. Barbed wire should be located far enough from protected installations to keep them beyond hand grenade range, yet close enough to ensure day and night observation and coverage by fire. Trip flares and perforated tin cans containing pebbles may be attached to the barbed wire as alarm devices.

h. Camouflage.--The purpose of camouflage is to conceal the location of the position of the battery or to mislead the enemy regarding its strength, type, and intentions. The three principles of concealment are siting, camouflage discipline, and camouflage construction. In organizing his battery position area, the battery commander must devise a camouflage plan to take advantage of natural concealment and to supplement the natural means by skillfully applying the principles of concealment. Camouflage is a passive means for defense of the position area and is especially important when the enemy has air superiority. For a detailed discussion of camouflage, see FM 5-20, Camouflage.

i. Deception.--Deception measures, such as those described in this paragraph, will not be employed without authorization by the appropriate commander. Dummy positions may be employed to deceive the enemy regarding the true locations of units. One or more artillery weapons may temporarily occupy positions, fire for short periods of time, and return to their primary positions. Roving guns may be used for harassing and interdiction missions. Registration may be conducted from supplementary positions.

5703. DEFENSIVE PREPARATIONS

a. General Defensive Measures

(1) Each battery should prepare an SOP for the conduct of its defense. The SOP should conform to the defense plan of the battalion. Procedures which apply to the defense of all types of batteries include the following:

(a) Each machinegun, air defense weapon, and antitank weapon must be protected by rifle fire.



(b) Sectors of fire are assigned to all crew-served weapons and stakes are set to indicate the lateral limits of the sectors.

(c) Indiscriminate firing of weapons is prohibited.

(d) Friendly forces which may be affected must be warned of planned direct artillery fire or long-range automatic weapons fire.

(e) Periodic reports should be made by all outposts. The reports should be staggered in time so as to preclude a report pattern.

(f) Unmistakable warning signals must be used.

(g) Personnel and weapons must not be silhouetted against the sky.

(h) Dawn and dusk patrols should cover the immediate terrain surrounding the battery.

(i) Barriers within the position area may be used to prevent the enemy forces that penetrate the perimeter from having direct access to all installations simultaneously.

(2) The following precautions must be observed during operations at night and under conditions of limited visibility:

(a) Reserve small-arms ammunition and grenades for night use must be distributed prior to darkness. Grenade boxes must be opened, and ammunition must be placed in magazines.

(b) When trip flares, flame field expedients, boobytraps, and mines are used, they must be armed prior to darkness.

(c) Strict adherence to the correct use of the sign and countersign is required.

(d) Outposts should be pulled in close to the perimeter, and listening posts should be established along avenues of approach. Night vision equipment and ground sensors should be employed when available.

(e) Movement within the defended area must be minimized.

(f) A definable point on the perimeter should be designated as an exit and entrance point.

(g) Firing of automatic weapons should be carefully controlled to prevent unnecessary disclosure of their locations.

(h) Light and noise discipline must be maintained.

(i) Strict compliance with chemical, biological, and nuclear attack detection and alarm procedures is required on a continuing basis.

(j) Warning devices and systems should be employed near main avenues of approach with monitors located as required by unit SOP.



(3) In addition to the main mission of providing prompt fire support, defense positions should be prepared and improved as time permits. The positions must be destroyed upon departure, since the enemy may occupy abandoned positions and attempt to prevent friendly reoccupation.

b. Perimeter Sketch.--When a battery is functioning as part of a battalion, the battery commander forwards an accurate sketch of the battery defenses to the battalion executive officer. His sketch is consolidated with those of the other batteries, and an overall plan for the defense of the battalion is devised. The information to be included on the sketch is prescribed in the battalion SOP. The sketch should include, in addition to weapon locations, the sites of the battery fire direction center, the command post, the switchboard, and other installations which might be sought by messengers or communication personnel. The technique of drawing a perimeter sketch (see fig. 39) is as follows:

(1) On a 1:30,000 map, place tick marks at 200-meter intervals along the sides of the grid square(s) containing the battery position. Connect the tick marks to form a grid.

(2) Attach overlay paper to a grid sheet and write coordinates in the margin.

(3) Reproduce the detail from each 200-meter square in the large squares of the grid sheet.

(4) The scale of the sketch on the overlay paper is now 1:5,000. Draw in the information required.

c. Warning System.--An efficient warning system is required for alerting the battery immediately upon the detection of enemy forces or when an attack is expected. Warnings are provided by electronic warning devices, warning systems outposts, listening posts, and patrols; and are transmitted by various means, including pyrotechnics, horns, whistles, gongs, weapons, and voice. Electronic surveillance devices may be used to augment the security provided by the outposts and listening posts. Provisions should be made for mutual warning among adjacent, supported, and higher units. In order to provide a standard method of disseminating emergency warnings within the NATO forces operating on land, the United States Armed Forces, together with certain other NATO forces, have concurred in the provisions of STANAG 2047.

#### 5704. TYPES OF ATTACK

a. General.--A field artillery battery may be subjected to air attacks, artillery or mortar attacks, ground attacks by small infiltrating parties or guerrillas, or ground attacks in strength by exploiting or bypassed forces. The defense against any attack is conducted aggressively. Predetermined defense plans and preparations are modified to fit the situation. The paramount considerations are continuance of the mission of the battery and the protection of the weapons.

b. Air Attack.--Artillery battalions and batteries may be subjected to frequent overflights by hostile reconnaissance and observation aircraft on target acquisition and intelligence gathering missions. In addition, extensive use of tactical aircraft against artillery units can be expected. The artillery battery has a limited capability to defend itself against an

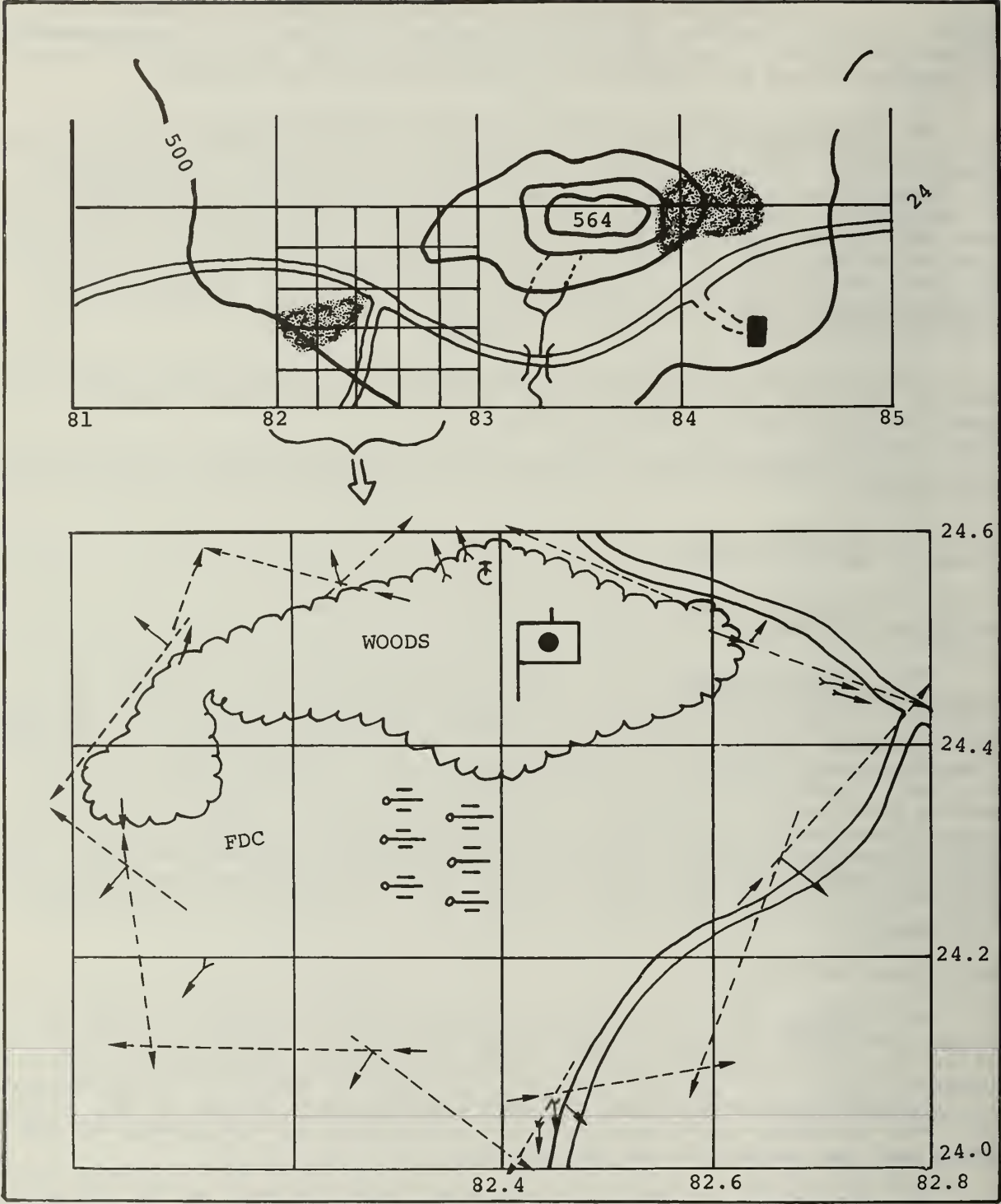


Figure 39.--Technique of Drawing Perimeter Sketch.

air attack. Passive means of defense, such as camouflage and dispersion, should be stressed. Aircraft recognition should be stressed in unit and individual training. Active defense against air attack is discussed in paragraph 5707.

c. Infiltration.--Small bands of infiltrators with a hit-and-run mission may attempt to destroy a small portion of the battery and cause disclosure of the locations of weapons and installations. Such attacks usually occur at night or during periods of poor visibility and may precede an attack in strength. If the attack is of limited strength and the gun-crews are reasonably well protected, personnel should use small arms and grenades, rather than automatic weapons or cannons, to disorganize and repel the attack. The battery security force should not be committed against such attacks.

d. Artillery or Mortar Attack.--When a battery is subjected to an artillery or mortar attack, every effort must be made to locate the enemy weapons and place them under fire. The battery commander may displace his battery to an alternate position when displacement is considered appropriate by the battalion commander. The battalion FDC should always be notified when the battery is under fire. Shell reports should be prepared and forwarded to the battalion S-2. The enemy considers artillery positions prime targets for mortar, artillery, and ground attack.

e. Attacks in Strength.--Attacks by strong forces may occur at any time. When an attack does occur, the entire battery is alerted and the defenses are fully manned. Outposts remain concealed to observe and report enemy movements and to adjust indirect artillery fire. When the enemy approaches the position, the outposts open fire to delay and disorganize the attack. Machineguns and other automatic weapons open fire when the enemy is within effective range. Antitank weapons attack enemy tanks, personnel, and crew-served weapons at close range. Personnel who are not engaged in operating a crew-served weapon deliver rifle fire from the main perimeter defense. Cannons not engaged in a fire mission deliver direct fire until no longer effective. To prevent the enemy from overrunning the position, the battery may interrupt a fire mission to deliver direct fire on the attacking enemy. If the enemy closes on the cannon positions, the cannoneers commence small-arms and grenade fire from the emplacements and from special trenches. The reaction (security) force is employed to reinforce the threatened area. Aggressive and determined resistance must continue until the attack is repelled. Once close defensive action begins, withdrawal by the defenders is difficult and costly. Artillery units that are prepared for defense will not be overcome unless overwhelmed by a force superior in number or weapons. After the attack is repelled, the artillery unit does not pursue the enemy, but continues its primary mission.

#### 5705. EMPLOYMENT OF WEAPONS

a. Small Arms.--Personnel must always have their individual weapons with them and ready for use. Ammunition must be in clips or magazines, ready for use; however, there should be no round in the chambers of weapons unless the individuals bearing the weapons are on patrol or are alerted against an attack. Distributing points for small-arms ammunition should be set up at frequent intervals along the main defensive line to provide immediate resupply.



b. Grenades

(1) Hand grenades are effective for close-in defense and are especially effective in repelling a night attack. A number of grenades should be readily available at all defensive positions. The use of fragmentation grenades must be closely controlled to prevent injury to friendly personnel.

(2) The grenade launcher, due to its range capability and accuracy, is effective in the defense of positions. It can be employed against targets that cannot be attacked by other means.

c. Machineguns.--Machineguns are employed both on the outposts and on the perimeter. Machineguns on the perimeter must be sited to provide covering fire for the outposts. The sectors of fire from these positions should overlap to provide a continuous belt of flanking grazing fire around the position area. Several positions may be selected for each machinegun outpost position for normal daylight use, positions on the perimeter for use at night, and positions for use after the withdrawal of the outposts.

d. Antitank Weapons.--Antitank weapon positions should not be located more than 200 meters beyond the perimeter. They should be covered by fire of other weapons and should be concealed and well dug in so that the individual or crew may remain in position to deliver fire from close range against the sides of tanks and armored vehicles. Positions for antitank weapons and routes to and from positions must be changed frequently to avoid disclosure of the defensive plan.

5706. DEFENSE OF THE ARTILLERY BATTERY

a. Organizing for Defense

(1) General.--The emplaced cannons are the nucleus of the battery defense. The firing position should be as compact as possible to provide greater control and security. (See fig. 40.)

(2) Cannon Emplacements.--The purpose of an emplacement is to provide protection for the piece and the cannoneers.

(3) Cover for Personnel.--Preparation of cover for personnel is begun after the battery is ready to deliver fire and the defenses have been organized. Foxholes or trenches should be available for all personnel at their normal duty positions and on the main perimeter. Priority should be given to preparing protection for personnel to include overhead cover. Cover for cannoneers is furnished initially by the cannon emplacement. Foxholes and special trenches are dug adjacent to the emplacement as soon as possible.

(4) Cover for Ammunition.--Initially, ammunition may be placed in small piles raised off the ground by improvised dunnage near the cannons, covered with a double thickness of tarpaulin at least 18 inches from the top ends, and sides of the pile and revetted with sandbags to provide temporary protection against enemy action and weather. As time permits, storage pits or trenches, equipped with platforms to hold the ammunition and provided with a means of drainage, should be constructed. These may be improved by the addition of overhead cover. Ammunition storage niches may be cut into the parapet.



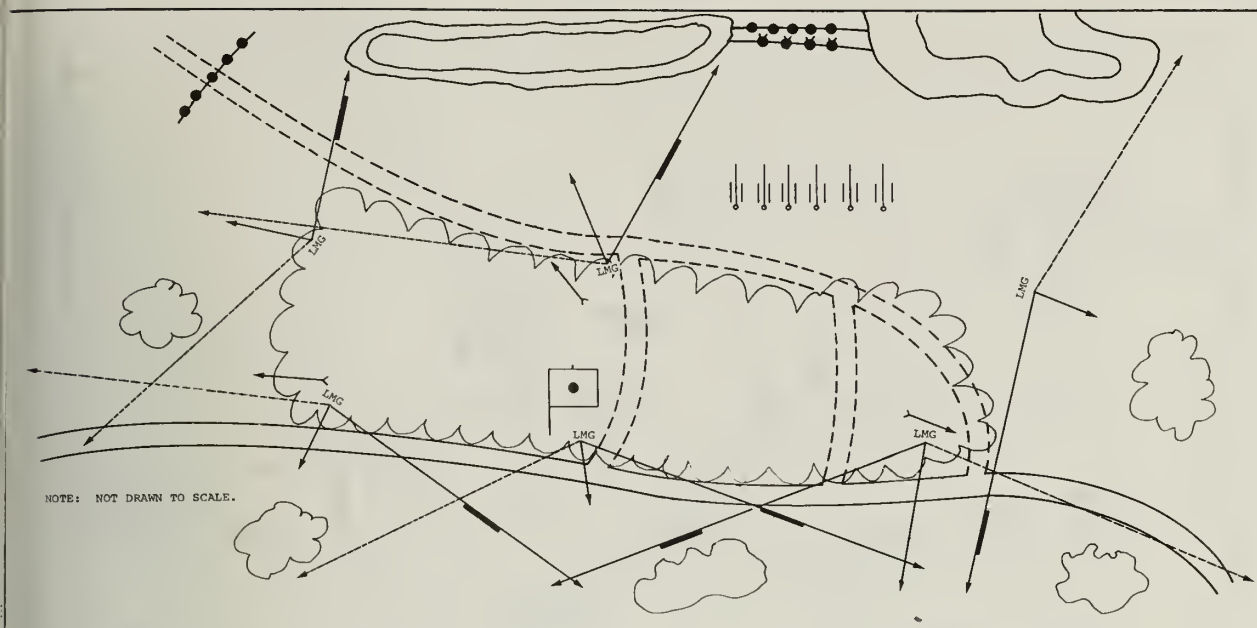


Figure 40.--Typical Battery Defense of a Firing Position.

b. Employment of Cannons in Direct Fire

(1) General.--The emplaced cannons deliver direct fire against an attacking force. These fires are integrated into the battery defense plan, and a sector of responsibility is assigned to each firing section. (See fig. 41). The sectors overlap to provide all-round coverage. Secondary sectors of fire are assigned to ensure continued coverage in the event a cannon is placed out of action. Enemy targets against which direct fire is used are usually those that are capable of returning fire at point blank range. Therefore, the speed and accuracy required in direct fire are very important, and should be stressed and drilled.

(2) Range Cards.--After sectors are assigned, each chief of section prepares a range card for his sector. (See fig. 42.) The ranges to critical points on all likely avenues of approach, whether within or outside the assigned sector, are indicated on the card. As time permits, a quadrant elevation is added for each recorded range. If there are no prominent terrain features in the sector, stakes may be driven into the ground for use as reference points. As time permits, estimated data on the card is replaced by more accurate data obtained by firing, pacing, taping, or map measurement. The range card must be readily available, and all men in the section should be familiar with its use. Range cards are also used by gunners of automatic weapons and antitank weapons.

(3) Supplementary Positions.--Supplementary positions should be prepared for those pieces unable to deliver effective direct fire from their primary positions. Both primary and supplementary positions should be stocked with ammunition prepared and clearly marked for direct fire missions. Supplementary positions should be selected as near the primary positions as possible to minimize the distance that the piece must be moved.

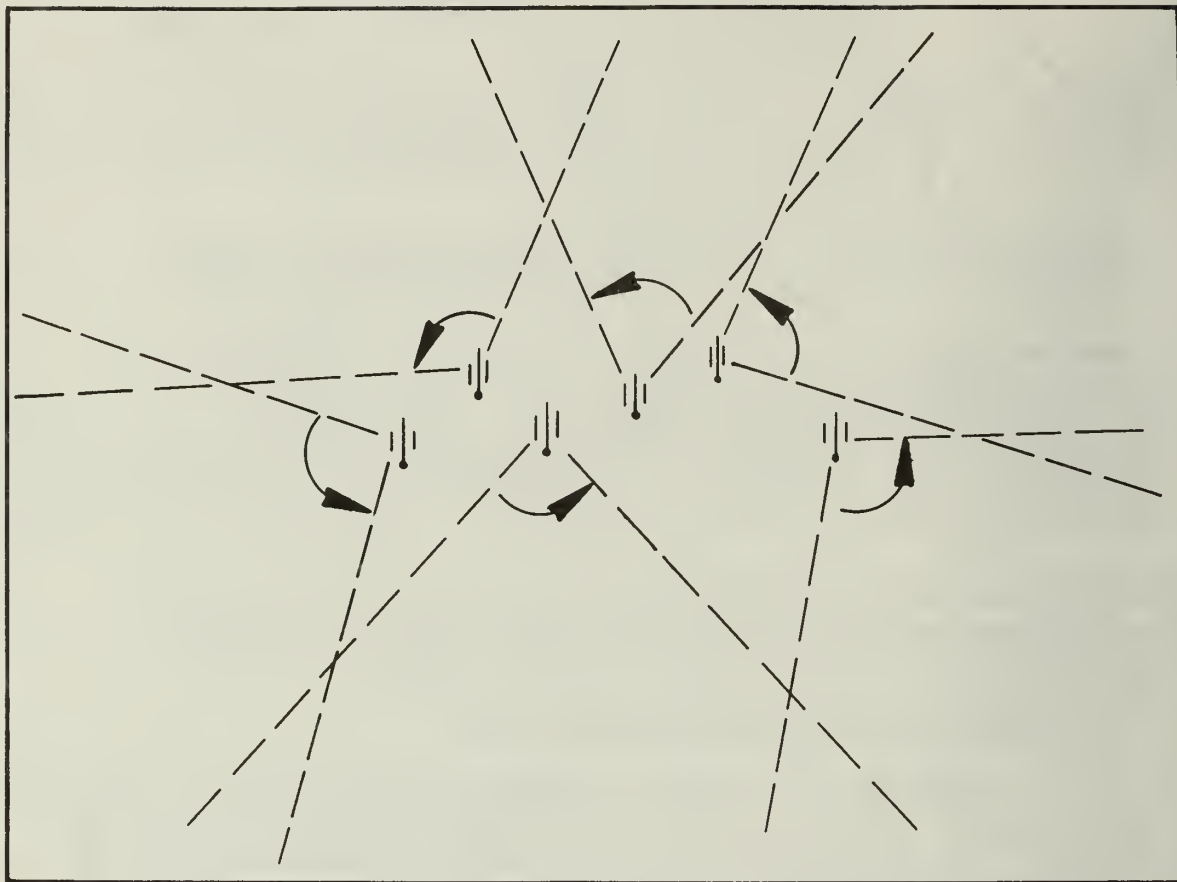


Figure 41.--Sectors of Responsibility of Cannons.

(4) Direct Fire.--Direct fire is most effective against armor at a range of 400 meters or less. Foot troops accompanying armor are vulnerable to artillery direct fire, particularly when the antipersonnel (APERS) round is used. All firing battery personnel should be familiar with the emergency destruction plans and procedures to prevent capture of beehive rounds. Direct fire is also effective against hovering or slow-moving helicopters. Direct fire sighting systems, fire commands, and methods of observation and adjustment on targets with a vertical profile are discussed in FM 6-40, Field Artillery Cannon Gunnery.

(5) Heavy Artillery.--Principles for the defense of heavy artillery batteries are the same as for light and medium artillery batteries. The direct fire capabilities of the heavy artillery battery are limited by the characteristics of the weapon. Automatic weapons and antitank weapons must be used more extensively in defending heavy artillery units.

#### 5707. DEFENSE OF THE HEADQUARTERS BATTERY

a. General.--Artillery headquarters batteries employ the same general type of defense as the cannon batteries. The locations of these units frequently permit integration of their defenses with those of adjacent units.

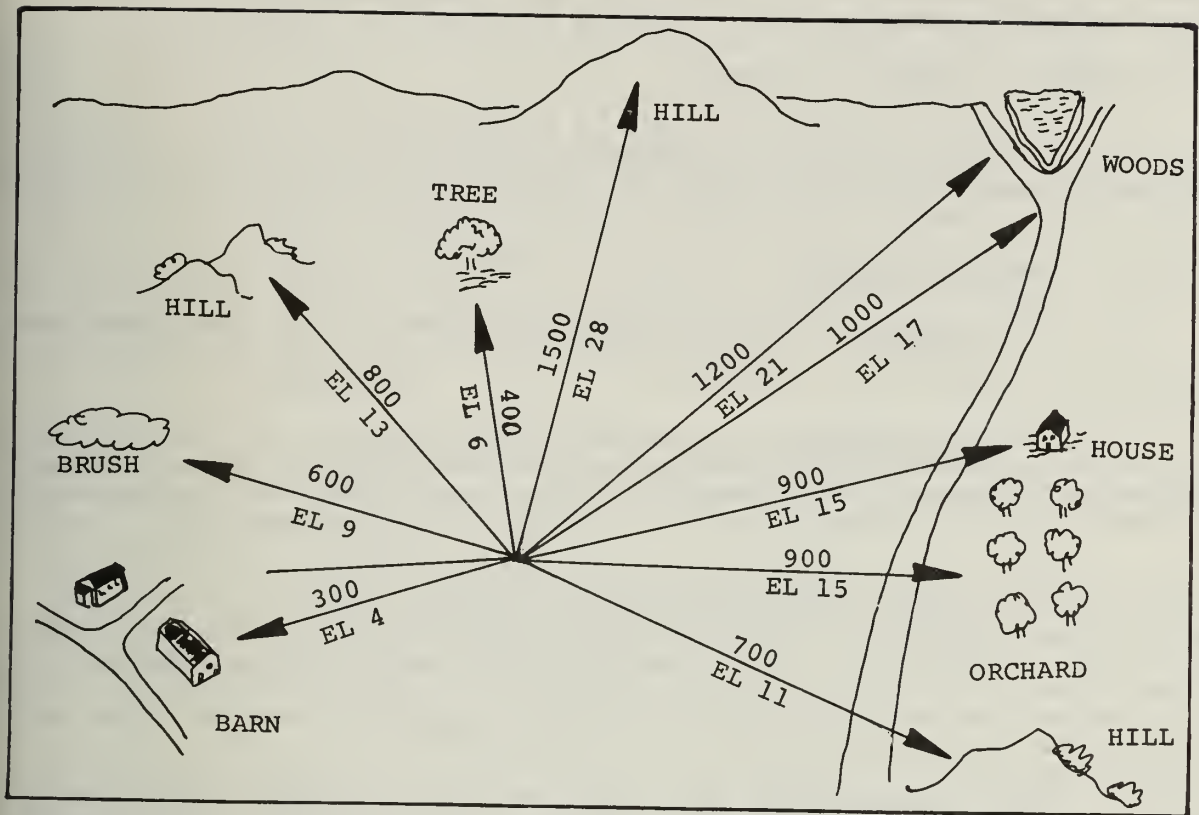


Figure 42.--Range Card for Direct Fire.

However, the echelonment of these units complicates the planning and implementation of their defenses.

b. Headquarters Battery.--The headquarters battery is divided into several installations, including the battalion command post, the aid station, and the battery headquarters area. Security is achieved with organic weapons and personnel by using the defensive characteristics of the terrain, arranging for mutual support with adjacent units, and organizing a reaction (security) force. Machineguns and antitank weapons are sited to cover the avenues of approach and are, in turn, covered by rifle fire. The elements of the battery such as the fire direction center, message center, and communication section, prepare their positions as strongpoints by digging foxholes and automatic weapon positions. An efficient warning system, plan for air defense, patrols, and security force round out the active defense measures. Passive measures include camouflage, field fortifications, and obstacles. The battery may be situated adjacent to, and its defense integrated with, other units, such as cannon batteries and

supported unit command posts; or it may be situated within the perimeter of the reserve elements of the supported force.

#### 5708. DEFENSE AGAINST AIR ATTACK

a. General.--The battery employs both passive and active defense measures against air attack. The battery counters low-altitude air attacks with large volumes of fire by organic weapons. Specific procedures relative to defense against air attack are contained in paragraphs c and d below

##### b. Passive Defense

(1) General.--Passive means of defense include camouflage and concealment, field fortifications, cover for personnel and materiel, obstacles, and communication security.

(2) Concealment.--Concealment is obtained by the use of camouflage nets supplemented by available natural camouflage. During marches, vehicles and other equipment peculiar to the battery should be camouflaged consistent with the movement safety and march requirements.

(3) Cover.--Requirements for concealment may conflict with those for field fortifications to protect personnel and materiel against enemy fires. Digging materiel shelters without violating camouflage discipline may be difficult. The advantages/disadvantages of concealment versus those of cover for personnel and materiel must be considered. Digging in should be done during darkness, and a plan should be made for disposal of spoil and elimination of tracks.

(4) Communications Security.--FMFM 2-3, Signals Intelligence/Electronic Warfare Operations (U), provides general guidance in all phases of communications security. Special attention should be given to operating patterns or procedures which may identify the battery. Communications security, survey, and advisory assistance is provided by supporting FMF and U.S. Navy units.

c. Active Air Defense Measures (Redeye).--The Redeye, a 29-pound, infrared homing air defense weapon system, provides a self-defense capability against low-flying aircraft. The Redeye weapon system is a component of an integrated and coordinated area air defense system. For further details and information pertaining to Redeye, see FMFM 5-5C, Employment of Forward Area Air Defense Battery.

##### d. Active Air Defense Measures (Crew-Served and Individual Weapons)

###### (1) Concept

(a) The threat posed by low-altitude aircraft may be partially countered by aggressive and discriminate use of a large volume of fire delivered by small arms and certain crew-served weapons.

(b) The individual and collective right of self-defense against hostile aircraft must be stressed. Exercise of this right does not require use of specialized communications and is independent of air defense rules for engagement.



(c) Indiscriminate use of nonair defense weapons must be prevented for tactical and safety reasons, such as the possible disclosure of friendly positions which may not have been detected by the enemy, and the safety of friendly forces. Engagement of hostile aircraft in immediate self-defense will be most frequent and should be emphasized in training.

(d) Perimeter and other security personnel should be assigned specific sectors in order to ensure all-round air defense surveillance.

(2) Rules of Engagement.--In the absence of orders to the contrary, individual weapon operators will engage attacking aircraft. Engagement of all other hostile aircraft will be on orders issued through the normal chain of command and will be supervised by unit leaders.

(3) Techniques

(a) General.--For air defense purposes, aircraft may be classified as low-speed and high-speed. Low-speed aircraft include helicopters and liaison, reconnaissance, and observation fixed-wing propelled aircraft. High-speed aircraft include all other propeller aircraft and all jet fixed-wing aircraft.

(b) Engagement of Low-Speed Aircraft.--In accordance with the rules for engagement, low-speed aircraft are engaged with massed, aimed fire delivered at the maximum rate of fire.

(c) Engagement of High-Speed Aircraft.--In accordance with the rules of engagement, high-speed aircraft are engaged with massed fire delivered at the maximum rate and aimed well in front of the aircraft and above its flight path in order to force it to fly through a pattern of fire. The technique does not require a careful estimation of aircraft speed and the required lead.

(d) Use of Tracer Ammunition.--The highest possible proportion of tracer ammunition should be used in automatic weapons. This technique provides a deterring and disruptive effect.

(4) SOP For Employment of Nonair Defense Weapons.--A battery SOP should include, but not be limited to:

(a) Applicability. (Operators of designated weapons.)

(b) Relation to the primary mission. (Primary mission is never prejudiced.)

(c) Relation to passive air defense. (The necessity for aggressively engaging hostile aircraft is balanced with the requirement to place in proper perspective the tactic of withholding fire to preclude disclosure of position.)

(d) Authority to engage. (Authority to engage attacking aircraft delegated to individual weapon operators and authority to engage all other hostile aircraft on order through the unit chain of command, subject to the rules of engagement and the rules for withholding fire.)

(e) Rules of engagement. (Normally, self-defense only against all attacking aircraft and those positively identified enemy aircraft which pose a threat to the unit.)

(f) Rules for withholding fire. (When ordered. When not positive that aircraft are actually attacking or when not positive that aircraft are hostile. When friendly aircraft or troops are endangered.)

(g) Criteria for selection of position.

(h) Firing techniques. (Lead and superelevation. Massed fire. Maximum rate of fire. Maximum use of tracer ammunition.)

(i) Unit training requirements. (Motivation and gunnery discipline.)

## Section VIII. EMPLOYMENT OF SURVEY, MET, AND RADAR SECTIONS

## 5801. GENERAL

In addition to the firing elements of the artillery, there are other sections that contribute significantly to the accomplishment of the fire support mission. These sections are the survey, meteorological, and radar sections which provide technical data that enables artillery to attack targets more effectively. Generally, these elements contribute to target acquisition and improved gunnery solutions. Various artillery units may contain one or more of these sections and may be assigned or reinforced with additional nonorganic elements to facilitate the accomplishment of the artillery mission for a particular situation. The artillery organization of the battalion, regiment, and separate batteries include adequate survey capabilities to execute all normal survey operations required by the command. A meteorological section is included in the organization of the artillery regiment and battalion. These sections are capable of providing either electronic or visual meteorological data, or both. Radar sections are normally included in the organization of the landing force artillery headquarters and in the division artillery headquarters and are the primary counterbattery and countermortar target acquisition agencies of the landing force. Other units, not normally found in Marine Corps artillery formations, may be attached to the landing force artillery, such as searchlight batteries, air defense units, and in some cases, aviation detachments.

## 5802. SURVEY

a. Mission of Artillery Survey

(1) The mission of artillery survey is to provide a common grid which will permit the massing of fires, delivery of surprise observed fires, delivery of effective unobserved fires, and transmission of target data from one unit to another. The establishment of a common grid is a command responsibility.

(2) Each artillery commander is responsible for ensuring that required survey control, consisting of position location, position height, and an orienting line of known direction, is furnished to subordinate units as soon as possible.

(3) Detailed information on survey operations is contained in FM 6-2, Field Artillery Survey.

b. Artillery Regiment Survey Operations.--The survey mission of the artillery regiment is to perform those survey operations necessary to place organic, assigned, or attached artillery units on a common grid. This mission is accomplished through field work, coordination, and the timely collection, evaluation, and dissemination of survey information. When a division is operating as part of an MAGTF, the common grid on which the division artillery units operate should be the MAF artillery grid. If MAF artillery control points are not available within the division area, the regimental artillery survey officer must select a starting point, assume survey control, and establish the division grid. Survey control is then extended from this point to within 1,500-2,000 meters of the using units. It is converted to the MAF artillery grid when MAF control becomes available. (See fig. 43.)

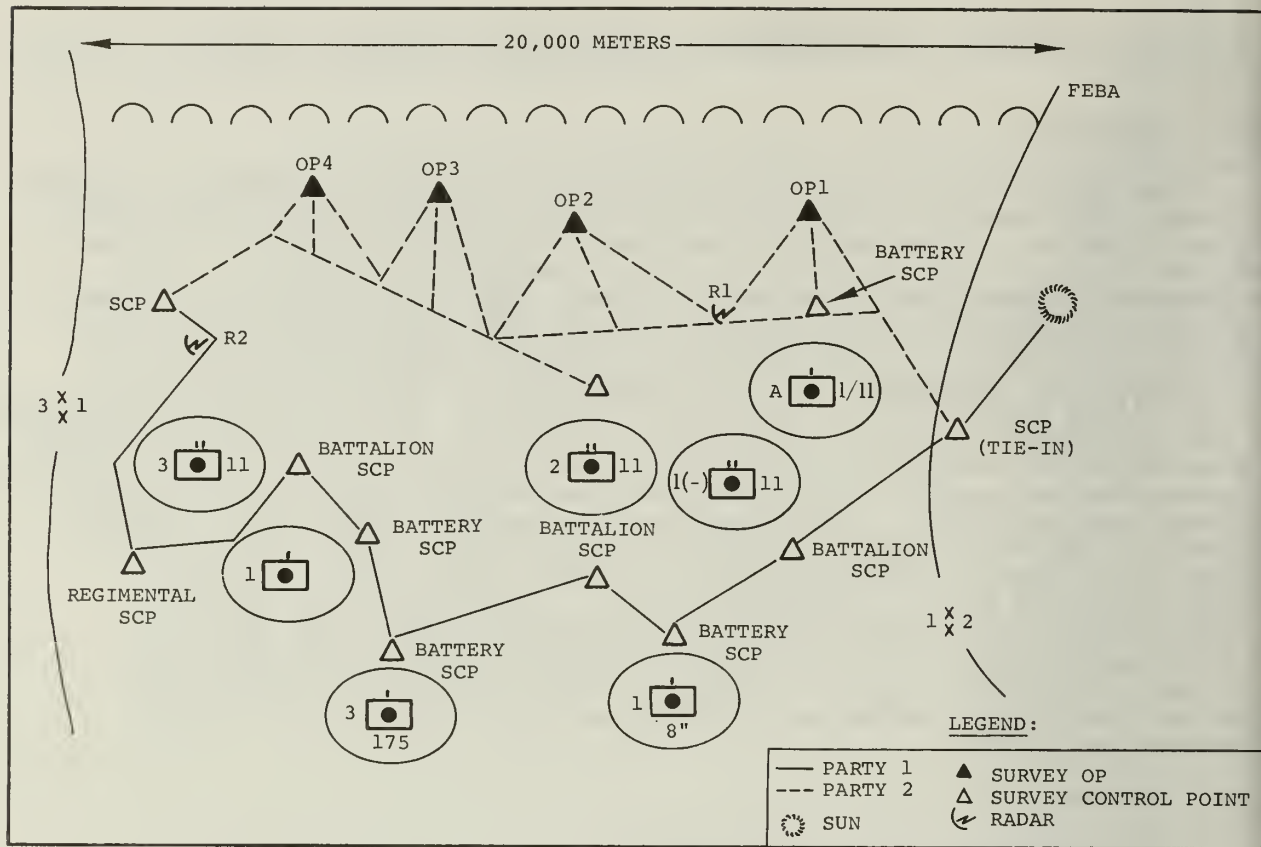


Figure 43.--Artillery Regimental Survey.

c. Artillery Battalion Survey Operations.--The survey mission of the artillery battalion is to provide timely survey control, executed within prescribed accuracies, to the required installations within the battalion. This consists primarily of the work necessary to determine the location, both horizontally and vertically, of the weapons and targets. Accurate survey permits the construction of surveyed firing charts which are used to determine initial firing data and for the transfer of target data. Battalion survey must provide a means of orienting weapons, instruments, and electronic equipment. Accomplishment of the battalion survey mission provides a common grid for firing units and target-locating installations and allows the artillery battalion to rapidly and economically mass its fires, deliver surprise observed fire, deliver effective unobserved fire and transfer target data between units.

d. Survey Information Center.--The purpose of the regimental artillery survey information center is to collect, evaluate, and disseminate survey information to units of the division. The SIC is usually located within or near the artillery regimental command post or the CP of the senior artillery echelon of an RLT/MAB or BLT/MAU. It is normally located near the artillery operations section (to facilitate communications), and it maintains a 24-hour operation. Personnel desiring survey information contact the SIC direct.



(1) A file of survey information is maintained in the SIC which includes trig lists covering actual and proposed areas of operation, a card index file (record of survey control point) containing all fourth-order (1:3,000) and higher control points and designated fifth-order (1:1,000) survey control points established by the artillery battalions.

(2) Survey information maps and overlays are maintained by the SIC to aid in the rapid dissemination of required survey information to using units and to aid the regimental survey officer in planning the division artillery survey. These maps and overlays should show information as follows:

- (a) Known survey control points.
- (b) Proposed surveys, to include, when possible, surveys proposed by the artillery battalions.
- (c) Completed surveys.
- (d) Friendly and enemy situation when it is such that it might affect the planning or performance of survey in the division area.
- (e) Present and proposed artillery positions in the division area.

(3) The survey information center is responsible for performing the following computations and checks:

- (a) Must check field records and computations of the division survey parties.
- (b) Must adjust all fourth-order traverses, to distribute minor errors in distance and direction throughout all stations occupied in the survey.
- (c) When required, must convert survey data to the landing force grid by swinging and sliding operations.
- (d) When required, must perform transformation computations for coordinates and grid azimuths between universal transverse mercator grid zones.
- (e) When required, must perform computations for conversion of coordinates from geographic to grid and from grid to geographic.

(4) The SIC maintains accurate time by use of a chronometer and radio for dissemination to units requiring accurate time for astronomical observations.

e. Landing Force Survey Control.--Consideration must be given to the requirements for engineer support in establishing horizontal and vertical control in the landing area. When trig lists and geodetic data are not available for the objective area, the survey capability of the landing force engineers must be augmented. Requests for augmentation by engineer topographic unit(s) is appropriate. The landing force engineer officer designates the landing force survey control points (SCP's) when adequate control can be

provided from trig lists and lists of geodetic data. During MAF sized operations, the landing force engineers possess the capability of extending control to the rear of the major elements (divisions) of the force and this control is to third order accuracy. Control, to the order required, is extended to the air support radar teams (ASRT's), target acquisition agencies, and artillery with the landing force. In MAB/MAU sized operations the engineers may or may not possess adequate survey capability. When this capability is not available, the artillery element of the landing force will often be assigned this responsibility. When a topographic unit is part of the landing force engineer task organization, the landing force trig list is maintained by the engineer unit with the artillery SIC(s) forwarding required data from the artillery trig list(s). If a topographic unit is not a part of the landing force engineer task organization, the senior or designated artillery headquarters SIC will maintain the target list. When the landing force artillery is assigned responsibility for all landing force tactical survey operations, the landing force artillery commander will designate SCP's, maintain trig lists, and provide survey control to all designated agencies of the landing force.

f. National Oceanic and Atmospheric Administration Officer (NOAA).--During declared war and other periods of total mobilization, the Department of Commerce provides to the Department of Defense officers of the National Oceanic and Atmospheric Administration for duty with the various armed services. NOAA officers are assigned to the headquarters battery, artillery regiment. A period of adjustment and familiarization with military survey and related requirements may be necessary upon initial assignment of these specialists. The NOAA officers are qualified in:

- (1) Surveys of coastal waters and adjoining land areas.
- (2) Observation, study, and prediction of ocean tides and currents, and the earth's magnetic elements.
- (3) Geodetic control surveys and related gravity and astronomical observations.
- (4) Production of nautical and aeronautical charts.
- (5) Seismological observations and investigations.

#### 5803. METEOROLOGY

a. Mission of Artillery Meteorology.--The mission of the artillery meteorology section of the various artillery headquarters batteries is to fill the meteorological needs of the field artillery by providing within the limits of their unit capabilities:

- (1) Ballistic messages.
- (2) Artillery computer messages.
- (3) Fallout meteorological messages.
- (4) Sound ranging messages.
- (5) Meteorology data to Marine aircraft wing (elements) as required or requested.

b. Artillery Meteorology Officer

(1) The accurate delivery of unobserved and observed artillery fires requires that artillery commanders at all echelons be continuously informed of the meteorology situation by the meteorology officer. There is one meteorology officer assigned by table of organization to each headquarters battery, artillery regiment; headquarters battery, artillery battalion; and headquarters battery, field artillery group. They are warrant officers with the military occupational specialty of 0803.

(2) The duties of the meteorology officer at each artillery headquarters are to:

(a) Supervise the operation of the meteorology section to include the production of the various meteorology messages.

(b) Advise the commander and staff on all artillery meteorology matters.

(c) Advise the headquarters battery commander on the selection of positions for meteorological stations.

(d) Advise and assist the S-4 in the procurement of meteorology supplies.

(e) Advise the commander concerning the requirements for radiosonde frequencies (where applicable).

(f) Advise and assist the S-3 in organizing and supervising the meteorology training program.

(g) Submit the necessary reports and keep pertinent records.

c. Capabilities of Artillery Meteorology Sections

(1) Artillery meteorology sections have the capability of sounding the atmosphere to heights of 30,000 meters, day or night, and in all types of weather except severe surface winds. These sections are mobile and have a mobility compatible with that of their parent artillery headquarters. Artillery meteorology sections in a landing force communicate with each other and exchange meteorology data on the landing force artillery metro net. Artillery units of the division not part of a landing force use the division artillery metro net. An artillery battalion operating independently of the artillery regiment receives meteorology information over the battalion fire direction net. Meteorology information is passed over the field artillery group fire direction net to attached units. Artillery units with a landing force ordinarily will obtain meteorology data by monitoring the landing force artillery metro net at specified times. They may also obtain meteorology data over the other nets listed above when those nets are utilized to pass meteorology data.

(2) Meteorology sections are capable of sounding the atmosphere approximately every 2 hours. A limiting factor is the period of time required for a sounding balloon to reach a required height. Where requirements for high altitude soundings exist and several types of messages are



required, meteorology sections are capable of sounding the atmosphere only every 4 hours. A meteorology section in position is capable of producing a ballistic message for light artillery in a minimum time of 30 minutes after the release of the balloon. The maximum time required to produce a maximum height fallout message is about 2 hours. Utilizing visual meteorology equipment, sections have the capability of measuring upper air winds by observing pilot balloons and of computing upper air densities and temperatures by using climatological tables in conjunction with the current surface values of each parameter.

(3) Artillery meteorology sections are trained to produce the following types of messages and data:

- (a) Ballistic messages, types 2 and 3.
- (b) Computer messages.
- (c) Fallout messages.
- (d) Sound ranging messages.

(4) Sections are further capable of reporting a variety of special parameters such as the temperature-humidity index, wind chill factor, and surface winds.

d. Scheduling of Meteorology Messages.--The scheduling of meteorology messages should be geared to the needs of the using units. Requirements for fallout messages are scheduled by the landing force (or division) meteorology officer. The artillery regiment S-3 publishes a schedule of meteorology requirements for the division artillery; this schedule is based on the schedule published by the landing force meteorology officer (when applicable). If there are two or more meteorology sections with the same capabilities in the same area, the landing force (senior headquarters) meteorology officer coordinates and rotates the meteorology requirements between the sections.

e. Requests for Meteorology Support

(1) In order to insure timely receipt of meteorology information, the unit requesting meteorology support should state the type of message, number of lines required, delivery time, and method of delivery. Ordinarily, the number of lines requested should be no greater than the number required for the maximum ordinate expected to be fired during the period of validity of the meteorology message. Also, if the meteorology information is required for other than a ballistic meteorology message, the data needed should be clearly and completely explained in the initial request. All requests for meteorology support should state to whom the meteorology data are to be forwarded (ordinarily to the S-3).

(2) Units requesting meteorology support must realize that it is extremely difficult for a meteorology section to provide ballistic meteorology messages more frequently than every 2 hours. Meteorology messages are provided on time schedules based on Greenwich mean time.

(3) During amphibious operations, ballistic meteorology support may be obtained from U.S. Navy shipboard meteorology stations in the NATO format. Requests for meteorology support must be made well in advance of time of need and should be reflected as tasks in CATF's operation order.



(4) Requests for ballistic meteorology messages between NATO forces should follow the standard format of STANAG 4103.

(5) For detailed information on meteorology support and operations, refer to FM 6-15, Artillery Meteorology, and FM 6-40, Field Artillery Cannon Gunnery.

#### 5804. RADAR

a. Mission of Field Artillery Radar Sections.--The mission of field artillery radar sections is to locate hostile artillery and mortars, and to register and adjust friendly artillery and mortars.

b. Capabilities and Limitations of Radar.--Radar operations are not affected by poor visibility due to darkness or fog; however, heavy rain or snow can reduce its capabilities. Mountainous terrain somewhat reduces mobility of the radar; however, due to the high angle of fire employed in this terrain, the radar can be very effective. Radar locates hostile artillery and mortars and is used to register and adjust friendly artillery and mortars. Radar has the capability of providing survey information when normal survey means are not available. The countermortar radar set AN/MPQ-4A is limited in its ability to locate hostile artillery firing, low trajectory, because of inherent countermortar design features. All radars are active devices and subject to electronic countermeasures. They are capable of employment in both mobile and static warfare environments. Countermortar and counterbattery radars have a mobility comparable to that of a towed 155mm howitzer.

#### c. Functional Characteristics of Artillery Radars

(1) Countermortar Radar.--These radars locate mortars by detecting the position of the mortar projectile at two points in space. The data obtained from these two points is inserted into a computer which extrapolates the trajectory of the projectile, determines the origin, and reads out the hostile mortar horizontal coordinates location. The AN/MPQ-4A is a countermortar radar.

(2) Counterbattery Radar.--The counterbattery radar function is performed by the AN/MPQ-4A using a modification to the computer which allows it to determine the point or origin or point of contact using either single or dual beam observation of a projectile in flight.

(3) Weapons Locating Radar.--This is a weapon locating radar system designed to locate the firing point of mortars, artillery, and tactical ballistic rockets. The radar scans a full 360 degrees and detects and tracks all moving radar returns within the radar field of view. The tracks are automatically tested to determine if they are projectiles and then are displayed on a plan position indicator (PPI). The AN/TPQ-31 is a weapon locating radar.

d. Organization.--A counterbattery/countermortar radar section (three radars) is organic to each headquarters battery, artillery regiment and a counterbattery/weapons locating radar section (two radars) is organic to each headquarters battery, field artillery group. These radar sections are organized to operate 24 hours a day. The section head in both cases is an additional duty for the assistant S-2 officer, a captain MOS 0802. He is assisted by a warrant officer, radar officer MOS 5910.

e. Tactical Employment

(1) The regimental/group commander or his S-3 normally designates the general position area in which the radar section may select positions. Such designations should encompass an area sufficiently large to enable the radar officer or the radar chief to select the actual radar location based on technical considerations affecting the operation of the radar. If possible, the radar position should be adjacent to one of the firing batteries. Such a position facilitates survey and logistics, and enables the section to take advantage of any existing defensive perimeter. Depending on the mission, terrain, and tactical situation, the radar position area will be located from 2,000 to 4,000 meters behind the FEBA.

(2) The commander also designates the sector of search for the radar. This sector of search will normally coincide with the zone of action of the supported unit. The coordination of the sectors of search of all artillery radars is the responsibility of the S-2 of the landing force artillery. For more detailed discussion on the tactical employment of artillery radars, see FM 6-40, Field Artillery Cannon Gunnery; FM 6-121, Field Artillery Target Acquisition; and FM 6-161, Radar Set AN/MPQ-4A.

(3) Radar site evaluation charts will be prepared and must be provided to the landing force artillery S-2 at the earliest practicable time to facilitate the preparation of the target acquisition capabilities chart.

## 5805. FLASH RANGING

a. Flash ranging is the procedure employed to locate points in the target area by visual observation and intersection from two or more observation posts. Optical instruments are used and line of sight to the target is required. Personnel engaged in flash ranging perform five principal missions:

- (1) Location of hostile artillery.
- (2) Registration and adjustment of friendly artillery.
- (3) Conduct comparative fall of shot calibration.
- (4) Collection of battlefield information.
- (5) Verification of location of friendly nuclear bursts(s).

b. For more detailed discussion of flash ranging, see FM 6-40, FM 6-121, and FM 6-122, Artillery Sound Ranging and Flash Ranging.

## 5806. SOUND RANGING

Sound ranging is the procedure used to locate the source of a sound wave by measuring the relative times of arrival of the sound wave at several accurately located microphones. Sound ranging locates hostile artillery pieces which are hidden from visual observation. Targets may be located by sound ranging to accuracies of 0 to 150 meters and to ranges of 20,000 meters, dependent upon the intensities of the sounds they produce,

and upon meteorological conditions. The Marine Corps does not currently possess the equipment to conduct sound ranging. For a more detailed discussion of sound ranging, see FMFM 6-40, Field Artillery Cannon Gunnery; FM 6-121, Field Artillery Target Acquisition; and FM 6-122, Artillery Sound Ranging and Flash Ranging.

#### 5807. SEARCHLIGHT OPERATIONS

a. Mission Searchlight Battery.--The mission of the searchlight battery is to furnish direct or indirect illumination in support of tactical night operations within divisions and MAF areas. (See USMC T/O M4201.)

b. Capabilities and Limitations

(1) The capabilities of the searchlight battery include:

(a) Mobile battlefield illumination.

(b) Sufficient communications to control organic searchlights.

(c) Capability of providing organizational maintenance for organic equipment.

(d) Air transportable (Phase I), and helicopter transportable.

(e) Platoons and sections that can operate independently for limited periods of time, but require communication augmentation from the battery communication section.

(2) The searchlight battery has certain limitations that should be considered in its employment:

(a) No survey capability.

(b) Communications limited to organic internal communications. External communications must be provided by the supported unit.

(c) Limited supply and maintenance capability.

(d) No medical capability at the platoon level.

c. Organization of the Searchlight Battery.--The searchlight battery consists of a battery headquarters and three searchlight platoons. The battery headquarters contains a headquarters, communications, maintenance, liaison, supply, mess, and medical section. Each searchlight platoon contains a platoon headquarters and three searchlight sections. The searchlight section is the basic organization with which a platoon accomplishes its assigned mission. (See fig. 44.)

d. Employment of the Searchlight Battery.--The normal method of employment is by platoon in general support, although the individual platoon or any element thereof is capable of limited independent action and can operate in direct support or attached to other units. In forward areas, the platoon or elements thereof are normally controlled at division

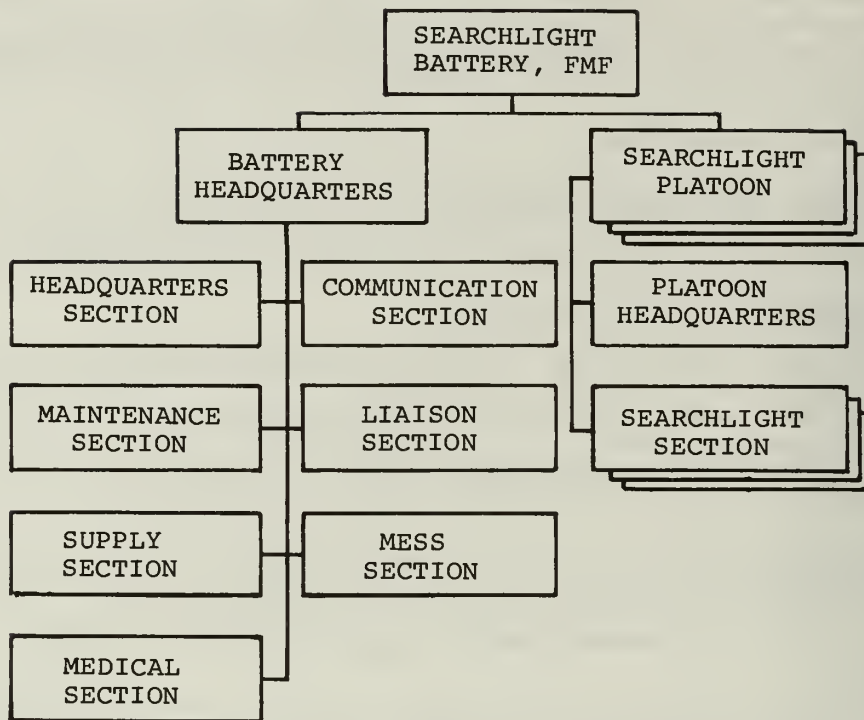


Figure 44.--Searchlight Battery.

or subordinate command echelons to preclude interference with other combat operations. Light missions will normally be received by the searchlight sections via the artillery fire direction center. For more detailed discussion of the employment of searchlights, see FM 6-40, Field Artillery Cannon Gunnery; and FM 6-115, The Field Artillery Searchlight Battery.



## SECTION IX. FORWARD OBSERVER

## 5901. GENERAL

- a. Responsibilities.--The responsibilities of the forward observer are to locate targets, adjust fire, advise the supported unit commander on the employment of the field artillery, plan fires, assist in fire support coordination, maintain continuous observation of the zone, report all target and intelligence information, and keep his parent unit informed of the situation, the plans, and the location of the supported unit.
- b. Assignment.--Each of the 105mm howitzer batteries of an artillery battalion is authorized four forward observer teams. An artillery battalion assigned a tactical mission of direct support provides a forward observer team to each rifle company of the supported force which normally is an infantry regiment.
- c. Status.--The forward observers of an artillery battalion in direct support are normally employed with the supported rifle companies of a regiment. The forward observers of an artillery battalion with a tactical mission of reinforcing or general support-reinforcing normally man artillery observation posts. They may, however, perform forward observer duties for the artillery battalion being reinforced. The status of the forward observer team with a rifle company, whether it be attached or otherwise, is determined by the tactical situation. Attachment is not the normal status for the forward observer teams assigned a mission of supporting a rifle company. However, when the forward observer is attached to a rifle company, he performs those duties directed by the supported commander.
- d. Coordination.--The operations of the forward observers of an artillery battalion with a direct support mission are coordinated by the artillery liaison officer at the supported infantry battalion. The coordination may also be accomplished by the artillery battalion S-3.
- e. Zone of Observation.--The zone of observation of a forward observer is the zone of action of the supported maneuver unit or the zone of observation of the parent battalion.
- f. Location.--The forward observer from an artillery battalion with a direct support mission normally remains close to the supported maneuver unit commander. If the forward observer is not, or cannot be, physically present with the supported maneuver unit commander, he insures that communications are provided between him and the supported commander. Forward observers manning battalion observation posts are normally positioned by the parent battalion.
- g. Terms, Definitions, and Procedures.--Information pertaining to the forward observers call for fire, subsequent corrections, and radio-telephone procedures for the conduct of fire is contained in FM 6-40, Field Artillery Cannon Gunnery.
- h. Communication Security.--The requirement for extensive use of radio in adjusting artillery fires increases the probability of degradation or denial of friendly use of radio systems due to enemy jamming or deception.

Unless all personnel are aware of the capabilities of electronic countermeasures, an enemy could block radio communications used in calling for artillery fire, or through deception, he could request a shift of fires onto friendly troops or installations. Secure voice encryption devices reduce the probability of enemy monitoring or deception. Defensive measures include the communication security practices discussed in FMFM 10-1, Communications; FM 24-18, Field Radio Techniques; and FM 32-5, Signal Security (SIGSEC) (U).

#### 5902. FORWARD OBSERVER FUNCTIONS AND DUTIES

a. Before reporting to the maneuver unit, the forward observer insures that his men and equipment are combat ready. He reports to the artillery battalion command post to obtain:

- (1) Indexed maps and/or photomaps, or photographs of the area of observation.
- (2) The enemy situation and locations of enemy installations.
- (3) The observation plan and location of artillery observation posts and other target acquisition means.
- (4) Essential elements of information (EEI).
- (5) The password, sign, and countersign.
- (6) The overall tactical situation including the amount and type of artillery available.
- (7) The quantity and type of ammunition available.
- (8) The counterfire policy.
- (9) The location of registration points and targets.
- (10) The location of the supported unit command post.
- (11) The communication plan, radio call signs and frequencies, and status of wire and radio communications in the area.
- (12) Extracts of communication operation instructions (COI) current codes.

b. En route to the supported maneuver unit command post, the forward observer should carefully note the terrain features and routes of communications. All members of the forward observer team must become familiar with the route so that, if necessary, they can return without him.

c. On arrival at the supported infantry battalion command post, the forward observer reports to the artillery liaison officer and obtains:

- (1) The situation and scheme of maneuver of the supported unit, including the location and plans for employment of the infantry weapons.
- (2) The location of the infantry company for which he will provide artillery support.

(3) Any additional information that is available to the liaison officer.

d. On arrival at the supported company, the forward observer reports to the company commander and:

(1) Determines the disposition of the company on the ground.

(2) Obtains plans of attack, defense, and patrol.

(3) Determines the local security and medical evacuation SOP of the company.

(4) Locates on the ground, if possible, the location of registration points, targets, and final protective fire.

(5) Checks communications, including establishment of radio nets and replacement of wire lines as may be required.

(6) Notifies the artillery unit FDC of his position.

(7) Briefs the members of his observation party on the situation, artillery fires, the supported unit's SOP, and their relationship with the infantry company.

e. Observation Duties.--During the period in support of the infantry company, the forward observer is responsible for the following:

(1) Determines, on the ground, the locations of the registration points, targets, and final protective fires as required.

(2) Establishes and maintains communications with the supported company, with the artillery battalion fire direction center, and with the artillery liaison officer.

(3) Keeps his own unit informed of his location and field of observation, the locations of the supported forces, and any change of their disposition.

(4) Reports all known enemy dispositions and movements, including the actions of enemy aircraft.

(5) Reports exactly what he observes or is told authoritatively, not what he infers or deduces from his observations.

(6) Briefs the members of his forward observer team on the situation and on the supported company SOP.

(7) Plans artillery fires, and advises and assists the supported company commander in fire support planning.

(8) Observes and adjusts fires, reports the results of these fires, and prepares a terrain sketch of his area when required. (See FM 6-40, Field Artillery Cannon Gunnery, for details on preparation of the sketch.)



(9) Prepares and dispatches a visibility diagram to the artillery liaison officer. (See FM 6-40, Field Artillery Cannon Gunnery; and FM 21-26, Map Reading.)

(10) Within his capabilities, coordinates observation and fires with other types of fire support.

(11) When qualified and authorized, observes and directs other types of fire support.

(12) Obtains locations of the supported unit's radars, night observation devices, and unattended ground sensors.

#### 5903. FORWARD OBSERVER WITH A COMPANY ON THE OFFENSE

a. General.--In offensive operations, the forward observer should operate as close as possible to the supported company commander; normally, this will be within voice contact. The company commander receives reports from all elements of his unit and will know where artillery support is most urgently needed. The forward observer is able to assist the supported unit in the offense by:

(1) Planning fires on enemy locations and critical areas, as necessary, to protect the reorganization of the supported unit following the seizure of an objective.

(2) Adjusting fire on enemy positions and fortifications, targets of opportunity, and other targets designated by the supported unit commander.

(3) Providing close and continuous artillery fire support for the maneuver of the company.

(4) Providing information regarding the enemy.

(5) Providing additional channels of communication.

b. Movement to Contact and the Reconnaissance in Force.--During these operations, the forward observer is concerned primarily with the maintenance of his communications and with fire planning. He periodically checks his communications with the FDC, artillery liaison officer, and other observers in accordance with the artillery battalion SOP. When time permits, the forward observer should plan fires on critical points along the line of march. He should consider the use of periodic marking rounds to provide a ready reference point of a distinctive terrain feature closely identifiable on the ground and map.

c. Coordinated Attack, Exploitation, and Pursuit.--When contact with the enemy has been made, the forward observer positions himself where he can best observe the actions of the supported unit, conduct fire missions, and advise the supported unit commander on artillery matters. If circumstances require that an observation post be established at a point distant from his supported unit commander, the artillery scout observer should perform the actual observation so that the forward observer can remain with the supported unit commander. The forward observer will coordinate with the supported unit commander before firing missions in an attack, since



the supported elements may have advanced to within an unsafe distance from the target. He must also exercise caution in adjusting fire on topographic crests when reverse slopes may be occupied by friendly forces.

d. Consolidation.--When the objective has been taken, the forward observer:

(1) Notifies the fire direction center and/or the artillery liaison officer.

(2) After consulting with the supported unit commander, plans and, when appropriate, fires protective targets (defensive fires) during the critical phase of unit reorganization.

(3) Maintains continuous observation and fire support.

#### 5904. FORWARD OBSERVER WITH A COMPANY IN THE DEFENSE

Artillery defensive fires are planned to break up attack formations, repel an enemy assault, and limit or destroy penetrations. The forward observer plans fires forward of, on, and behind the supported unit's defensive position. On-call defensive fires are fired only with the supported commander's approval and when required. Subsequent firing is used to confirm firing data. The fires of weapons that will fire final protective fires (FPF) normally should be adjusted as soon as the ground locations of the FPF have been selected. The forward observer transmits the order to fire the FPF when directed by the maneuver commander. The fire of each weapon should be individually adjusted if the time, situation, and availability of ammunition permits. As soon as practicable, the forward observer should construct a visibility diagram in at least two copies. One copy is used by the FO to assist in increasing his accuracy; and most important, one copy is forwarded through the artillery liaison officer to the artillery battalion S-2 so that the battalions can determine which areas are not under ground observation.

#### 5905. FORWARD OBSERVER IN THE RETROGRADE

When the supported unit is conducting a retrograde, the forward observer remains with the supported unit commander. However, he may direct the remainder of his forward observer team to displace with the withdrawing forces in order to maintain continuity of observation and fire.

#### 5906. FORWARD OBSERVER WITH A COMPANY IN PATROL ACTION

a. Patrol Support.--Providing fire support for friendly patrols is an important function of the forward observer. The forward observer may accompany a patrol when it consists of the major portion of the supported unit. If the company operations plan indicates that he should accompany a patrol, he must advise the artillery liaison officer accordingly. He should then leave a member of his FO team with the remainder of the supported unit during his absence. He furnishes complete information on all patrols to his battalion FDC.

b. Patrol Planning.--Planning for artillery support of a patrol must be coordinated before the patrol begins. Planning includes the following steps:

(1) The supported unit commander notifies the forward observer of the size of the patrol, times of departure and return, mission, routes, and any special instructions.

(2) When the supported unit commander requests artillery support for the patrol, the forward observer contacts the patrol leader and personally plans the support. When possible, the forward observer and the patrol leader examine the patrol route on the ground, and plan fires on critical areas.

(3) The forward observer gives the patrol leader the target numbers and locations of the planned target.

(4) The forward observer fires in the targets if the situation warrants.

(5) The patrol leader informs the forward observer of the communication instructions of the patrol, including emergency signals.

(6) The forward observer makes arrangements to maintain communications with the patrol, when necessary.

c. Armored/Mechanized Patrols.--When the forward observer accompanies an armored/mechanized patrol, he is normally found in the command vehicle with the supported unit commander. If dismounted infantry accompany armor on a patrol, the forward observer must be prepared to adjust artillery fire from either an armored vehicle or on the ground.

#### 5907. OBSERVATION POSTS

Artillery observation posts (OP's) may be required to provide for greater depth of observation and more complete coverage of the battlefield than can be accomplished by the FO's. Artillery observation posts are established as directed by the artillery commander.

a. Location.--In selecting the location for the OP, consideration must be given to the area to be observed and the locations of other friendly installations. The concurrence of the maneuver commander in whose zone the post is to be located must be obtained.

b. Knowledge of Tactical Situation.--Observers must be informed of the current tactical situation as it exists in the immediate vicinity of the OP. In addition, they must be familiar with the plan of attack or defense of the infantry elements in whose zone the post is located and with those elements whose zone of action lies within the zone of observation.

c. Liaison and Communication.--In addition to functional communications with the parent unit, effective liaison must be established with the supported unit commander and, where appropriate, communications must be established with the cognizant FSCC; e.g., when the OP is established by an artillery battalion with a direct support mission or has the capability to observe or call fires short of the no-fire line.

## 5908. ADJUSTMENT OF NAVAL GUNFIRE

The artillery observer must be competent in adjustment of naval gunfire. Additionally, the artillery battalion is responsible for training and providing the naval gunfire spot teams of the shore fire control parties (SFCP) that provide support to the maneuvering units. Since only two SFCP's are provided to an assault RLT, the requirement for adequate coverage of the battle area and provisions for infantry company naval gunfire support depends primarily upon the supporting artillery forward observers. Naval gunfire (NGF) spot teams can be utilized to supplement artillery FO's when naval gunfire is not available. The necessary training of artillery observers in naval gunfire spotter procedures is accomplished in cross-training of the SFCP's and the FO teams. Particular emphasis must be placed on an understanding of communication differences and the means by which the FO can request and adjust naval gunfire. Any number of systems may be employed to include the actual provision of radios for FO parties to enter the naval gunfire ground spot nets. When such augmentation is not available, a multi-channel system to the supported infantry battalion FSCC (NGF liaison officer) or to a NGF spot team may be used.



## Section X. AIR OBSERVATION

## 51001. GENERAL

Air observation for artillery is provided by all air observers (AO's) within the landing force. Tactical air observers (TAO's) and artillery aerial observers receive similar training. The TAO generally supports the requirement of the infantry while the artillery AO fills billets in the artillery regiment and force artillery. Nevertheless, both contribute to the infantry and artillery elements as well as the overall landing force intelligence and operations requirements. Through an interchange of information, aerial observers of the landing force provide an effective coverage of the objective area. This section deals primarily with the artillery aerial observer.

## 51002. ORGANIZATION

Artillery aerial observers are included in the tables of organization for the headquarters battery, artillery regiment, and headquarters battery, field artillery group. Tactical air observers are assigned to the Marine observation squadron (VMO). The VMO ground surveillance officer coordinates their employment in support of ground operations. The aircraft utilized by the artillery aerial observer is normally provided by the VMO.

## 51003. ARTILLERY AERIAL OBSERVER EMPLOYMENT

a. The artillery aerial observers are utilized jointly by the intelligence and operations sections of the artillery regiment/FAG. The aerial observer provides a means of target acquisition and target confirmation for the S-2. Unlike the tactical air observer, the artillery aerial observer is primarily concerned with the conduct of artillery fire missions. The operations section (S-3) employs the aerial observer to coordinate gunnery and to locate and attack enemy targets. After approval by the artillery S-3 (FDO), targets of opportunity are attacked in a manner similar to those attacked by a ground artillery forward observer.

b. Control of artillery AO's is normally exercised by the senior regimental commander through the appropriate FDC. Operational control, in turn, is exercised by the FDC through the artillery air spot net. During the amphibious assault, while the aerial observers are operating from carriers or helicopter platforms, control is initially exercised by the tactical air commander or his representative; when the artillery aerial observer reports on station, control is normally shifted to the unit employing him.

## 51004. EMPLOYMENT CONSIDERATIONS

There are certain factors that must be taken into consideration that affect employment of artillery AO's and the manner in which they accomplish their tasks. Among these are the following:

a. Visibility.--The following examples indicate normal conditions of visibility:



- (1) 500 Feet.--The aerial observer can identify troops by type of uniforms and equipment. He can observe smoke to a distance of 25 miles.
- (2) 1,000 Feet.--The aerial observer can identify whether shell holes and foxholes are occupied or unoccupied.
- (3) 1,500 Feet.--The aerial observer can identify moving infantry elements attacking in the open and can follow the action.
- (4) 2,500 Feet.--The aerial observer can observe small bodies of troops in the open.
- (5) 5,000 Feet.--The aerial observer can identify large-scale movement of troops in the open and uncamouflaged weapons.
- (6) 10,000 Feet.--The aerial observer can identify convoys and long marching columns.

b. Security

(1) Security is affected by the type and strength of hostile antiaircraft defense, the characteristics and defensibility of friendly equipment, other friendly air activity in the vicinity, skill in avoiding detection and interception under prevailing weather and visibility conditions, and the effectiveness of flak suppression and friendly air warning systems.

(2) Light aircraft may operate forward of friendly lines whenever enemy antiaircraft defenses are inactive or nonexistent. When enemy antiaircraft defenses are active, combat type armed aircraft may be necessary for sustained flights over enemy held territory. Flak suppression fires may be employed to assist observation of hostile installations.

c. Fatigue.--Approximately 2 hours is considered to be desirable for the most effective observation. Normally aerial observers fly no more than two missions each day during routine periods of operation.

d. Orientation.--Artillery aerial observers and pilots should be familiar with the terrain over which they operate to maintain orientation without frequent diversion of their attention to study maps during the flight. Whenever possible, observer teams should be assigned to the same zone of observation on successive flights. Changes in enemy dispositions, increased activity, and additional installations are discernable through familiarity with the area.

e. Continuity.--Aerial observation is maintained continuously during the hours of daylight and as required during the hours of darkness.

51005. TASKS

The maneuver of observation can be as important as the maneuver of troops or firepower. This is the primary capability of the artillery aerial observer. He may often provide the only means of observation of certain areas, location and attack of enemy installations, or confirmation of suspected enemy activity and counterfire means. The tasks which may be assigned to the artillery aerial observer include the following:

- a. Registration of artillery units on deep or defiladed registration points.
- b. Location of targets and adjustment of fire.
- c. Surveillance of planned fires; coordination and control of fires in support of moving elements.
- d. Search and surveillance of enemy activity.
- e. Oblique air photographs for the study of terrain, target location, friendly camouflage, and suspected activity.
- f. Surveillance on camouflage discipline of friendly units.
- g. Reconnaissance for artillery positions and routes.

#### 51006. BRIEFING OF AIR OBSERVERS

The ability of the artillery aerial observer to locate targets, adjust fire, collect information, and avoid repetition is based on a knowledge of contemplated plans and actions. The basic techniques of observation and tactical application will vary with the requirements set out in the briefing.

a. Types of Briefings.--The artillery aerial observer is concerned with two types of briefings:

(1) Briefing for Operations.--A briefing prior to embarkation for the amphibious objective area in which the artillery aerial observer is to be employed is given to provide initial orientation and overall guidance.

(2) Mission Briefing.--This may be a formal briefing by a staff officer or a short concise orientation upon reporting on station, or both, according to the situation and time available.

b. Briefing Procedure.--If possible, the artillery aerial observer should be thoroughly briefed by appropriate staff officers. The artillery aerial observer, in turn, is responsible to brief his pilot. The briefings may be conducted aboard ship, at the air facility, or the artillery command post. When the artillery aerial observer is responsible for tactical and gunnery coordination or control, as part of an operation, he should be present at all scheduled conferences and regular briefings of ground commanders and staffs.

(1) Recording Information.--All written matter carried by the aerial observer must be concise and, for security reasons, easily disposed of in event of capture.

(2) Briefing Aids.--Briefing is simplified by the use of a briefing form. In addition, the following briefing aids can be used to assist the air observer in memorizing data:

- (a) Relief maps and models.

(b) Motion pictures, aerial photographs, and stereopairs.

(c) Situation and operation maps and overlays.

(3) Preflight Briefing.--All artillery aerial observers should be briefed prior to flight on all pertinent points of the mission, including:

(a) Location of battery position areas, registration points, targets, known points, reference lines to be used, suspected targets, and areas to be searched.

(b) Tactical situation, to include location of friendly troops and no-fire lines and zones of action of supported unit.

(c) Surveillance required, time of mission, type of adjustment to be made, maps and photographs to be used, known enemy air defenses, flight instructions, and security restrictions.

(d) Communication details, to include location of ground radios and panel stations, channels to be used, frequencies, call signs, check-in times, and prearranged signals.

(e) Enemy information such as lines, areas, and suspected targets may be recorded on the flight map. Photographs, obliques or verticals, are gridded and marked for direction and location of critical points, lines, and areas.

#### 51007. REPORTS AND DEBRIEFING

Messages transmitted while the artillery aerial observer is airborne are necessarily as short as possible; therefore, detailed information concerning the target or event reported upon is obtained through later debriefing. Amplifying reports will be more complete and accurate if the artillery aerial observer is able to relay additional information as soon after landing as possible. When time is the controlling factor, the observer may make message drops of sketches, overlays, or photographs to amplify specific reports.

a. Procedure.--An accurate log of aerial observer transmissions is kept and pertinent information is posted on situation maps; however, this system must not interfere with the gunnery or tactical aspects of the FDC.

(1) During landbased phases of air observation operations, the aerial observers and pilot are normally debriefed by the chief aerial observer or an intelligence officer. The artillery aerial observer is asked for all available amplifying details but should be cautioned frequently to distinguish between facts and conclusions. Debriefing forms should be available to prevent omission of important details. Forms filled in by the artillery aerial observers and pilots are reviewed by the S-2. When these forms indicate important information, the observation team concerned must be debriefed immediately even if there are other teams waiting for debriefing.

(2) When artillery aerial observers are operating from carrier bases and helicopter platforms, they will be debriefed upon return. Any amplifying information gained may be forwarded through normal intelligence



channels. It may be air-dropped at the command ship on return if the information is urgent, or delivered by subsequent flights.

b. Evaluation of Reports.--In order that information may be accurately and completely stated, it is essential that artillery aerial observers exercise care in the preparation of reports. An artillery aerial observer should report exactly what he has seen, where he saw it, and the time which that particular observation took place. The accurate evaluation of such reports can form a basis for command decisions. Personnel charged with evaluation of air observation reports should be familiar with the following:

- (1) Factors affecting aerial observation.
- (2) Capabilities and limitation of the aerial observers.
  - (a) State of training.
  - (b) Combat experience.
  - (c) Psychological characteristics of the aerial observer.
  - (d) Accuracy of previous reports.
- (3) Information from other sources and agencies which tend to verify or discredit the aerial observer's report.

#### 51008. GUNNERY

The artillery AO transmits his calls for fire in the same manner as the forward observer. Observation procedures and techniques are discussed in detail in FM 6-40, Field Artillery Cannon Gunnery.

#### 51009. AIRBORNE SENSORS

The requirement for artillery observation missions is normally met by visual observation; however, airborne sensors including photographic equipment may be necessary for accomplishment of certain missions. Observers may be equipped with handheld cameras and/or the aircraft may be equipped with infrared, side-looking airborne radar, and ambient light devices.

#### 51010. COMMUNICATIONS

The artillery AO operates on the artillery air spot net with the artillery units. In addition to radio communications, the artillery AO may utilize certain alternate means to include:

- a. Panels.
- b. Message drop and pickup.
- c. Pyrotechnics.
- d. Flashing lights between the ground and aircraft.
- e. Prearranged maneuvers of the aircraft.



## 51011. AERIAL OBSERVER TRAINING

Artillery AO's should receive both tactical and gunnery aerial observation training.

a. Individual Training.--Individual training should provide the following:

(1) Sufficient training in the air so that the aerial observer is able to recognize and evaluate terrain features and to locate them on the ground from maps and photographs.

(2) The ability to recognize troop formations and equipment in position and during movement.

(3) The ability to request and adjust artillery and naval gunfire.

(4) Familiarization with the enemy organization, tactics, techniques, and equipment.

(5) The ability to observe areas rapidly, locate enemy installations, identify them accurately, and report concisely.

(6) The aerial observer's status as an air crew member requires, at the minimum, the following aviation training:

(a) Survival, evasion, resistance, and escape (SERE) training.

(b) Water survival and rescue pickup training.

(c) Aviation safety training.

(d) Physiological training.

(e) Limited aircraft systems indoctrination.

b. Observer Team Training.--The following instruction should be provided:

(1) General training in the air and on the ground with artillery units. An understanding of tactics and techniques are developed in this manner with a consequent increase in observation proficiency.

(2) Artillery units utilize the aerial observer during normal field firing exercises. The FDC personnel and intelligence section should participate in all training by assigning "search and surveillance," "search and report," "search and attack," and conduct of registrations by aerial observers.

(3) Artillery aerial observers are assigned duties with the intelligence and operations sections or in the artillery battery when they are not participating in air observation training.

c. Staff Indoctrination.--It is particularly important that artillery commanders and staff officers appreciate the capabilities and limitations of aerial observation and understand principles of employment.

d. Naval Gunfire Airspot Training.--Training is accomplished by working directly with naval gunfire ships and their spotters to accomplish cross-training. When naval gunfire units are not available, training may be accomplished by using naval gunfire spotting procedures with high velocity artillery weapons such as the 175mm gun.

## Section XI. FIRE SUPPORT COORDINATION

## 51101. GENERAL

The coordination of supporting arms is the means by which the commander influences the action through firepower. Fire support coordination is the function of correlating the fires of one or more of the major supporting arms with the plan of operations. Additionally, it provides for troop safety and safety of friendly aircraft from the effects of landing force fire support means. The major supporting arms that are normally available to the commander include close air support, naval gunfire, and artillery. Coordination of supporting arms is generally limited to the selection of the most suitable support means for planned or requested missions. Targets of opportunity are normally coordinated only to the extent of avoiding undesirable duplication of fires, endangering friendly elements, or interfering with an adjacent unit unless additional control, coordinating, and limiting measures are imposed by the commander. The supporting arms representatives process these requests in the same manner as planned missions. A complete discussion is contained in FMFM 7-1, Fire Support Coordination; NWIP 22-2(-), Supporting Arms in Amphibious Operations; and FM 6-20, Field Artillery Tactics and Techniques.



## CHAPTER 6

## COMMUNICATIONS

## Section I. GENERAL

## 6101. INTRODUCTION

Communications in artillery are essential to efficient fire support and are a command responsibility. The commander's estimate of communication requirements should provide adequate communications with all elements of his command and with supported, reinforced, and adjacent units. All means of communication are utilized as required without designating a primary means. Artillery communication systems are improved as time and situation permit. Radio communications are backed up by wire and multichannel radio as rapidly as possible, and alternate means are made available by interfacing with adjacent, reinforced, higher, and supported units' communication systems. This chapter discusses only those facets of communications that directly influence the artillery unit. Overall Marine communication operations and systems are discussed in FMFM 10-1, Communications.

## 6102. RESPONSIBILITIES

Responsibilities for establishing the communication system is determined in accordance with the following principles:

- a. Senior to Subordinate.--The higher or senior unit is responsible for establishing and maintaining communications with the subordinate unit.
- b. Supporting to Supported.--A unit supporting another unit is responsible for establishing and maintaining communications with the supported unit.



c. Reinforcing to Reinforced.--A unit reinforcing the fires of another unit is responsible for establishing and maintaining communications with the reinforced unit.

d. Joint Responsibility.--Although one unit is specifically charged with establishing and maintaining communications with another unit, it is only through the joint effort of all concerned that communications are ensured. If communications are lost, immediate reestablishment is the joint responsibility of all units affected.

e. Cooperation.--It is necessary that units and elements of the artillery cooperate, without respect to any responsibility for establishment, in order to effect a rapid and reliable communication system.

### 6103. TACTICAL EMPLOYMENT OF COMMUNICATIONS

The communication system established by artillery units in any tactical situation is a command decision based on the mission, the commander's estimate of requirements, and the facilities available. There are no standard communication systems that work best in every situation. The type communication systems contained in sections II and III, however, offer possible solutions and a means from which to deviate for the particular mission, situation, and area of operations.

a. Offensive Operations.--In preparation for offensive operations, complete communication facilities will usually be established. During the offense, the rapidity of movement dictates the facilities to be established. Wire is employed whenever time permits. Radio is employed to the maximum in rapid-moving situations.

b. Defensive Operations.--Wire systems are normally expanded by duplicating lines on alternate routes and installing lateral lines to adjacent units. Radio may not be utilized initially; nevertheless, all nets are established and placed in a standby condition for immediate operation. Wire communications can be provided for liaison officers and forward observers. Wire is installed to alternate and supplementary positions to facilitate early communications when they are occupied. Improvement of communications is continuous.

c. Retrograde Operations.--Communications during retrograde movements are similar to those used in forward displacements. Provisions are made for strict regulation of radio operation. This may include silencing certain stations or establishing dummy stations for deception. The existing system continues to operate while preparing for displacement. When the situation permits, all wire not required by units is recovered or destroyed. During the movement, radio silence is normally maintained for the purpose of deception while normal traffic is continued in the old position by elements designated for this purpose.

d. Displacement.--The displacement poses the most difficult communication problem for artillery. Reliance must be placed on radio communications. When an artillery unit displaces by echelon, the advance echelon includes radio sets for communications in command, conduct of fires, and fire direction nets. Maintenance of contact between artillery units and between their advance and rear command posts requires the maximum utilization of all means of communication. Aircraft may be used for message drop and pickup service. During marches, radios are used for

column control and for contact with forward observers, reconnaissance, and security parties with supported and higher units. Messengers are used between march units and within groups and serials of individual march units when radio silence is imposed.

#### 6104. CONSIDERATIONS

In formulating the tactical communication system, the following areas must be considered:

a. Area of Operations.--The type and amount of communication equipment necessary to provide the desired control of subordinate elements is influenced by the terrain, weather, and their effect on the capability of available equipment. Augmentation of equipment and technicians may be necessary whenever weather and terrain effects result in reduced range and/or equipment failure.

b. Tactical Mission.--Tactical missions of general support, direct support, reinforcing, and general support-reinforcing may be assigned to an artillery unit at various times throughout the operation. The communication system must provide adequate means to control, coordinate, and provide the fires required by the tactical mission.

c. Type of Control.--The type of control exercised by the commander over his subordinate units will be a major consideration in formulating the communication system. Control may be centralized or decentralized based on the concept of operations.

d. Type of Fire Direction.--The type of fire direction utilized by the artillery FDC may be technical, tactical, or both. The type of fire direction will dictate the number and type of conduct of fire and fire direction nets to be used. The communication system must be reliable, rapid, and flexible.

e. Mission of Supported Units.--The communication requirements of an independent operation, such as a pursuit or helicopterborne assault, will require special consideration of the communication needs. Whether the support is in the offense, defense, or retrograde action, the supported unit will dictate definite requirements and limitations which are influenced by the situation.

f. Tactical Situation.--It is necessary to facilitate future operations and communication requirements based on the present tactical situation and the indications deduced from intelligence and friendly plans. The tactical situation will require varied communication installations.

g. Equipment and Personnel.--The equipment capability to transmit and receive under adverse conditions of terrain, weather, and combat will dictate the necessity for augmentation, alternate means of communication, and the amount of radio retransmission equipment necessary. The state of training and number of personnel available is a primary influence on the extent of the communication plan. Communication personnel should be trained in as many facets of communication as are possible. Both radio and wire personnel should be cross-trained. Both radio and wire personnel must be made acutely aware of the absolute need for reliability, speed, and accuracy of all communication systems. The use of personnel assigned to noncommunication billets can enhance the radio communication capability.

The use of infantry communication circuits and channels can reduce the communication burden; however, they should normally be used only for backup.

h. Proximity of Units.--The proximity of subordinate artillery units will dictate the type of control and fire direction to be utilized. Short distances enable the units to lay wire and establish reliable radio and multichannel radio systems. Multichannel radios, radio teletype, and CW on radio circuits become increasingly more important to the communication system on independent or dispersed operations. It will be necessary to utilize radio retransmission means, long-range radio equipment, and special antennas during periods of displacement or when units are operating at a distance from each other.

i. Communications Security (COMSEC).--Communications security is the protection resulting from all measures designed to deny unauthorized persons information of value which might be derived from the possession and study of communications or to mislead unauthorized persons in their interpretation of the results of such possession and study. Communications security includes physical, cryptographic, emission, and transmission security. It is a command responsibility of the highest order. The requirements of communication systems users and the need for communications security measures must be balanced against operational expediency and can only be determined in light of existing conditions.

#### 6105. COMMUNICATION REQUIREMENTS

The communication requirements for artillery units are based on the organizational level of the unit administrative, tactical, and technical requirements of the artillery headquarters and its organic elements. Communication requirements may be fulfilled by utilizing wire, radio, and multichannel radio facilities as an integrated system or several distinct and complete systems utilized to back up each other.

##### a. Internal Requirements

- (1) Provide tactical/administrative supervision/control.
- (2) Exchange information and intelligence.
- (3) Disseminate meteorological data.
- (4) Disseminate and coordinate survey data.
- (5) Provide and control aerial observation.
- (6) Provide fire direction/control as appropriate.

##### b. External Requirements

- (1) Receive tactical and administrative/logistics orders.
- (2) Coordinate and request additional artillery fire.
- (3) Communicate with other fire support means.
- (4) Receive and transmit warnings.

- (5) Exchange information and intelligence.
- (6) Receive fire missions from higher and reinforced units.
- (7) Receive meteorological data.
- (8) Communicate with external agencies.
- (9) Monitor ground surveillance sensors and/or receive intelligence from ground surveillance coordination centers.



## Section II. COMMUNICATION SYSTEMS IN DIVISION ARTILLERY

## 6201. GENERAL

This section discusses the normal employment of radio, wire, and multichannel radio. It should be understood that the situation in combat, with regard to equipment, personnel, time and the area of operations, must dictate a system or systems of communication that will enable the artillery to accomplish its tactical mission of fire support. The normal allocation of channels and frequencies will generally provide flexibility for the commander and his communication officer to devise an adequate system of communication. Higher headquarters may reduce or increase external requirements to complement the overall situation. There is not a material difference between the communication requirements of artillery units occupying joint-command posts and those utilizing separate command posts. The activation of additional radio nets, establishment of representative liaison, and less dependence on personal liaison are characteristics of the communication system in the separate command post.

## 6202. TYPE COMMUNICATION SYSTEMS OF THE ARTILLERY REGIMENT

The artillery regimental commander and his communication officer will provide the necessary guidance to subordinate elements to effect an integrated and coordinated communication system. The artillery regimental command post may be utilized as the division alternate command post. The artillery regiment provides artillery representation in the division FSCC. Included in this representation are certain communication personnel and equipment for use by the artillery officer in performing his fire support coordination duties. The artillery regimental FDC possesses the capability to operate for a limited period as the FSCC of the division alternate CP when established with the artillery regiment. The headquarters battery of the artillery regiment is organized and equipped to provide the means to exercise tactical fire direction and coordination of organic and attached artillery units.

a. Installation Responsibilities.--The communication company, headquarters battalion, and the communication platoon, headquarters battery, artillery regiment, establish the required communications at the division primary and alternate command posts.

(1) Communication Company, Headquarters Battalion.--The division communication company provides a multichannel radio circuit which it installs, operates, and maintains between the division command post and the artillery regiment command post. Additionally, this company is responsible for the installation and operation of all wire facilities, multichannel radio terminals, and teletype systems in the division FSCC. When the division alternate CP is located at the artillery regiment CP, the division communication company provides additional equipment, circuits, and personnel.

(2) Headquarters Battery, Artillery Regiment.--The communication platoon of this battery is responsible for the installation and operation of all wire facilities within the artillery regiment CP, and additionally provides wire and multichannel links to subordinate units. The battery provides personnel and equipment to operate all internal and external radio nets for the division FSCC.

b. Radio Communication System.--The radio communication system contained in figure 45 portrays a typical system. Nets are activated and deactivated as required. Individual pieces of equipment may often be used for several "standby" requirements.

(1) Internal Requirements.--Communication personnel and equipment are provided from the headquarters battery to establish and operate the following internal nets:

(a) Regimental Command Net.--This net provides a means for the commander to exercise command and control of subordinate units. Although this net is primarily intended for the transmission and reception of administrative and logistical information, it may be used as an alternate fire direction net. Stations on the net include the artillery regimental headquarters, battalions, attached units, and the division alternate command post.

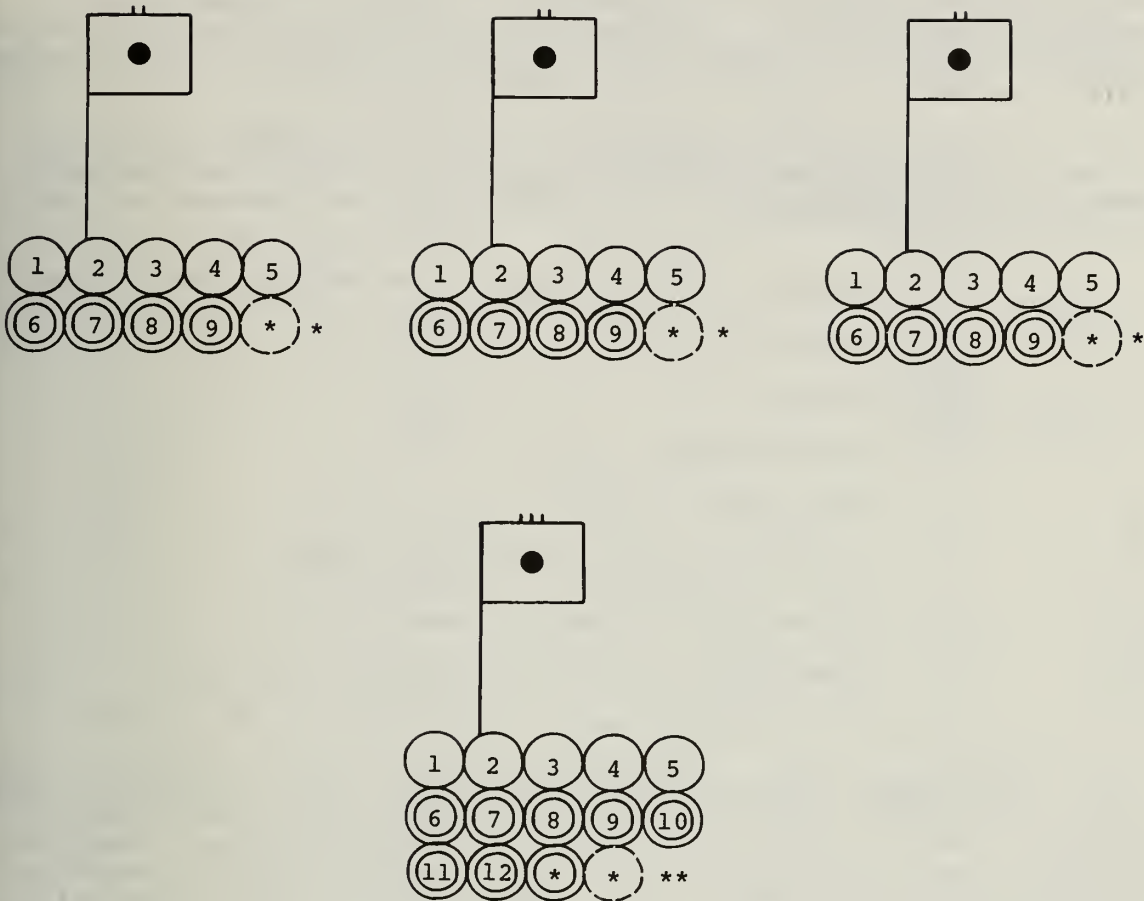
(b) Regimental Tactical Net.--Fire planning, counterfire information, positions of units, fire capabilities, fire support coordination, and infantry planning are generally transmitted over this net. It is ideally suited as a common net to the artillery liaison officers at the infantry FSCC's. In addition, it provides a supplemental means for the commander to exercise command and control over subordinate units when the command and fire direction nets become overloaded. Stations on this net include the division main and alternate command posts as required, artillery regimental headquarters, artillery battalions, attached units, and liaison officers.

(c) Regimental Fire Direction Net.--This net provides a means for the commander to exercise fire direction and fire control of subordinate units by the assignment of fire missions, designation of units to fire, and the conduct of regimental time-on-target missions. Subordinate units may use this net to request additional fires from regimental organic and attached units. This net is used only for fire direction and fire control except in an emergency. Stations on the net include the division main and alternate command posts as required, artillery regimental headquarters, artillery battalions, attached artillery units, and liaison officers.

(d) Artillery Radar Telling Net.--This net provides a means for the exchange of radar intelligence information and requests for the surveillance of enemy counterfire weapons. It may also be used for the registration and adjustment of artillery fires by radar. Stations on the net include the artillery regimental headquarters, countermortar/counterbattery radar sites, artillery battalions, and batteries as required.

(e) Artillery Air Spot Net.--This net provides artillery aerial observers with a means to transmit target information to artillery units and to adjust fires. Multiple artillery air spot nets are normally required. Stations on the net include the division command post, artillery regimental headquarters, artillery battalions and batteries as required, and other as needed.

(f) Artillery Survey Net.--This net provides a means for the exchange of survey information and data between survey teams and, when required, the artillery survey information center. Stations on the net include the artillery regimental headquarters, and artillery battalions and batteries as required.



LEGEND:

- |   |                               |    |  |
|---|-------------------------------|----|--|
| ① | Regimental Command Net        | ⑩  | Division Command Net 1                                 |
| ② | Regimental Tactical Net       | ⑪  | Division Tactical Net                                  |
| ③ | Regimental Fire Direction Net | ⑫  | Landing Force Fire Direction Net                       |
| ④ | Artillery Radar Telling Net   | *  | As Required Nets (Higher, Reinforced, and As Directed) |
| ⑤ | Artillery Air Spot Net        | *  | Guard As Directed                                      |
| ⑥ | Division Artillery Survey Net | ** | Listen As Required                                     |
| ⑦ | Division Artillery Metro Net  | ⊖  | Activated On Order                                     |
| ⑧ | Division Intelligence Net     | ⊕  | Higher Echelon Nets                                    |
| ⑨ | Division Alert/Broadcast Net  |    |  |

Figure 45.--Artillery Regimental Radio Communications.



(g) Artillery Metro Net.--This net provides a means for the exchange of meteorological information and ballistic meteorological information between division artillery units. Stations on the net include the artillery regimental headquarters, artillery battalions, and batteries as appropriate, and the division command post as required.

(2) External Requirements.--The artillery regiment normally establishes stations on the following radio nets to higher headquarters. See FMFM 10-1, Communications, for a description of the purpose and composition of these nets:

- (a) FLanding force artillery command/fire direction net.
- (b) Command net #1.
- (c) Tactical net.
- (d) Alert/broadcast net.
- (e) Intelligence net.
- (f) Artillery air spot net (as required).
- (g) Air observation net (as required).
- (h) Damage control net (as required).
- (i) Reconnaissance net (as required).

c. Multichannel Radio Communication System.--The multichannel radio communication system of the division includes an artillery multichannel system which interfaces with the infantry multichannel system. (See fig. 46.) In the absence of specific orders, the responsibility for establishing and maintaining multichannel radio communications between units will follow the general principles of:

- (1) Senior to subordinate.
- (2) Supporting to supported.
- (3) Reinforcing to reinforced.
- (4) Parent command to attached.

d. Wire Communication System.--Wire is used within the command post for local telephones, wire/multichannel radio terminals, radio-wire integrated circuits, teletype circuits, and radio remote connections. Trunklines are installed between the artillery switching center and the division alternate command post switching center. Trunklines may also be established to subordinate and attached units when distance, time, and the tactical situation permits.

e. Teletype System.--Teletype channels are designated in the multichannel radio equipment and a teletypewriter switching center is located in the regimental fire direction center. Teletypewriter channels to force artillery are obtained through the division switching center.



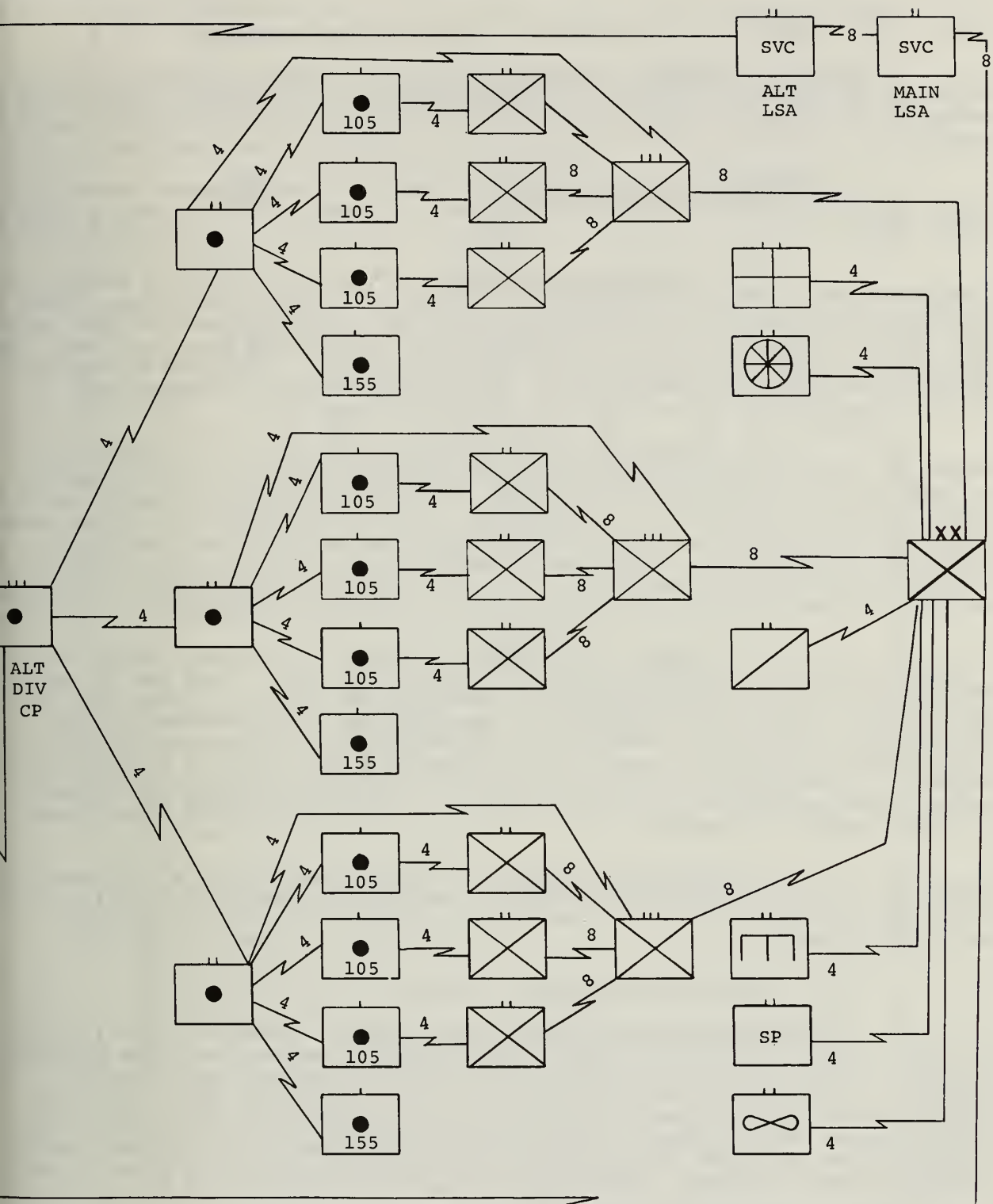


Figure 46.--Multichannel Radio Communication System  
for a Marine Division.

## 6203. TYPE COMMUNICATION SYSTEMS OF THE ARTILLERY BATTALION

a. Radio Communication System.--The radio communication system depicted in figure 47 portrays a system designed to supervise and control subordinate elements and to answer calls from higher and reinforced headquarters. Internal nets are activated and deactivated as required.

(1) Internal Requirements.--Communication personnel and equipment are provided from headquarters battery to operate the following internal radio nets:

(a) Battalion Command Net.--This net provides a means for the commander to exercise command and control of subordinate units. Fire planning, fire support coordination, movements and displacements, and ammunition reports and planning information may be transmitted over this net. It may also be used as an alternate fire direction net. Stations on the net include the battalion headquarters, artillery batteries, attached and reinforcing units, and may include liaison officers.

(b) Battalion Fire Direction Net.--This net provides a means for the commander to exercise tactical and technical fire direction of subordinate units by the assignment of fire missions, designation of units to fire, tactical fire orders, and the issue of technical firing data. Requests for reinforcing fires from subordinate and supported units are received over this net. It is not normally used for the conduct of fire missions. Stations on the net include the battalion headquarters, batteries reinforcing and attached artillery units, and liaison officers.

(c) Conduct of Fire Net.--This net provides a means for forward observers to request and adjust artillery fire. This net is established at the artillery battalion headquarters when fire direction is centralized. When fire direction is decentralized, each battery in the battalion has a separate conduct of fire net terminating at the battery headquarters. There are usually four conduct of fire nets in each artillery battalion. Stations on the net include the battalion headquarters, batteries, forward observers, liaison officers, and attached and reinforcing artillery units as required.

(d) As-Required Nets.----As-required nets are activated as permitted by the equipment and personnel available. Some of the nets which may be activated by the battalion are survey, warning, tactical, and intelligence.

(2) External Requirements.--(See par. 6202b(2).)

b. Multichannel Radio Communication System.--Normally, a multichannel radio link is installed between the artillery regiment and the artillery battalion. The artillery regiment provides the equipment and installs, operates, and maintains both terminals. The artillery battalion has the capability of providing multichannel radio communications to each of its batteries and the additional capability of establishing multichannel radio communications with the headquarters of the infantry unit for which it is providing direct support. (See figs. 46 and 48.)

## 6204. TYPE COMMUNICATION SYSTEMS OF THE ARTILLERY BATTERY

Artillery batteries cannot deliver effective fires without an adequate communication system. Interface with artillery and infantry multichannel

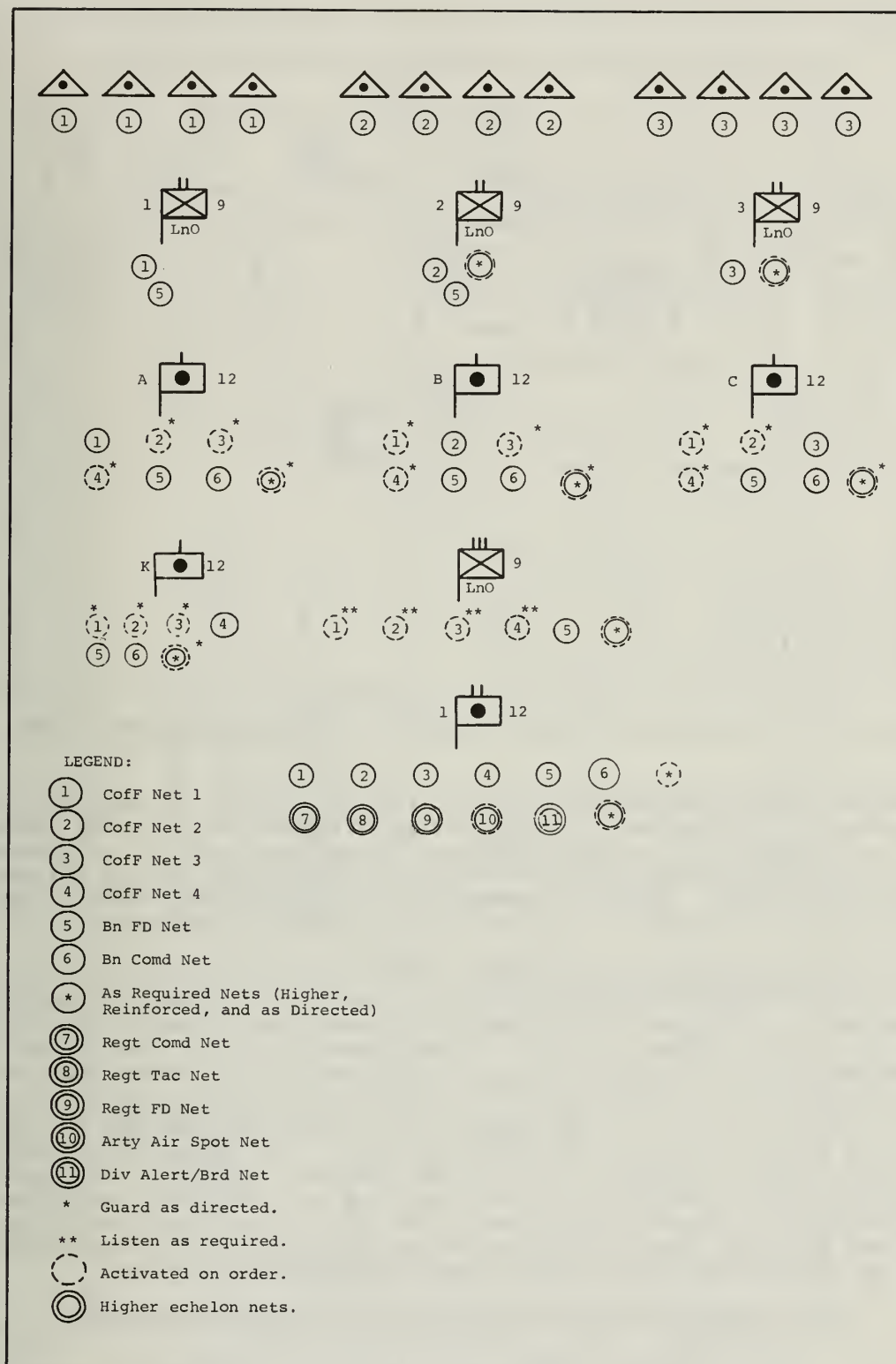


Figure 47.--Artillery Battalion Radio Communications.

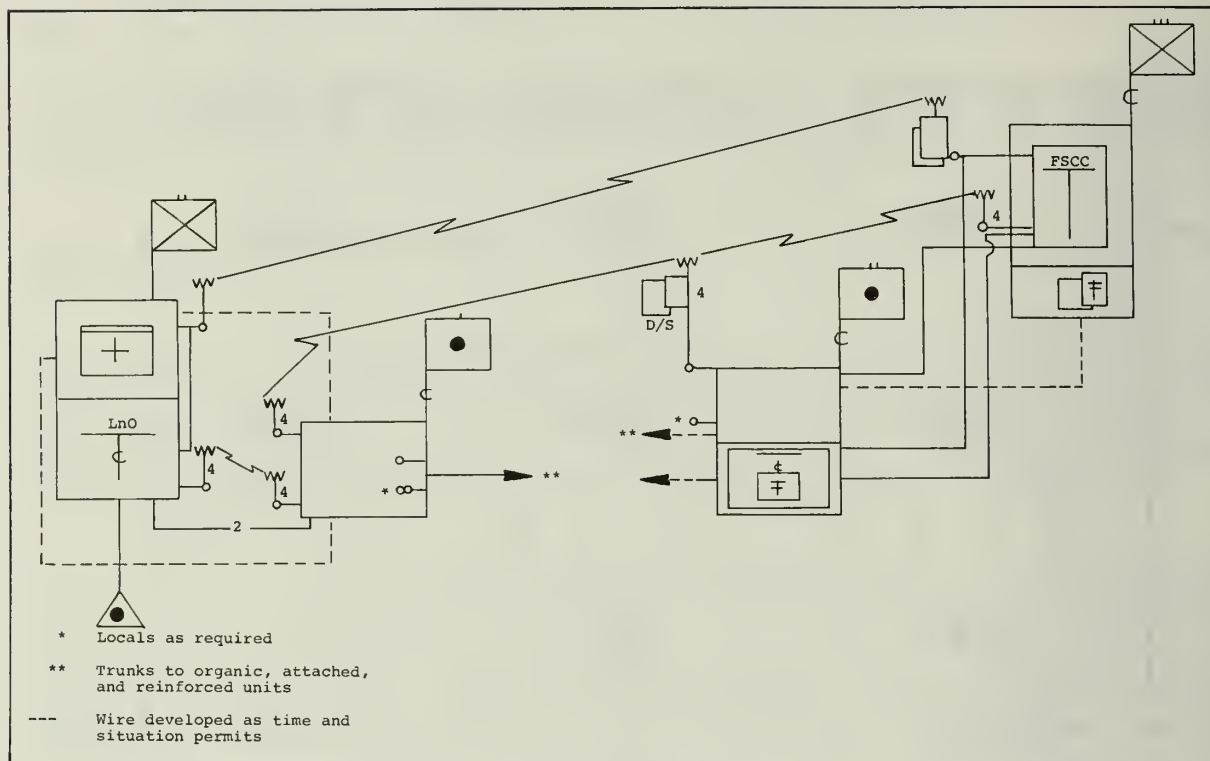


Figure 48.--Typical Artillery Battalion Wire-Multichannel Radio.

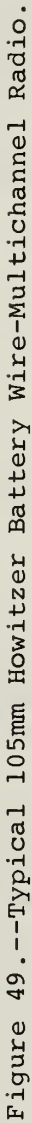
radio systems provide alternate means of communication, or desirable redundancy. Radio is particularly useful during displacement, in the initial stage of occupation, for widely dispersed operations, and in a fast-moving situation. Wire is easier to operate and more reliable in the defense or a slow-moving operation. Battery communication systems are based on the mission and guidance provided by the artillery battalion commander.

a. Radio Communication System.--The radio communication system is established by the communication, liaison, and forward observation elements of the battery. This system is established under the supervision of the artillery battalion unless operating under decentralized fire direction or as an independent or attached unit. The systems of the 105mm howitzer battery of an artillery battalion or a 155mm howitzer battery of an artillery battalion differ little. All nets used by one may be required by the other; however, the extent of their use often differs. For example, forward observers and liaison officers of the 105mm howitzer battery of the artillery battalion habitually guard the conduct of fire net, whereas the 155mm howitzer battery of the artillery battalion does so only periodically. The internal and external nets listed below may be established, maintained, and operated as required by their mission and parent headquarters.

(1) Internal.--The following nets are established when required:

(a) Battery Conduct of Fire Net.--Utilized to receive calls for fire from organic, attached, and reinforced unit observers. Fire is conducted over this net directly between the observer and the battery FDC.





When a fire direction net does not exist or is not operating, this net may be used as a conduct of fire/fire direction net.

(b) Battery Command/Fire Direction Net.--Utilized for the purpose of transmitting fire direction and command information to subordinate elements. This net will be utilized generally when elements are operating at a distance from the battery, during displacement, and to control reinforcing and attached artillery units. When the conduct of fire nets are insufficient, it may be used as an alternate conduct of fire net.

(c) As-Required Nets.--Activated utilizing equipment and frequencies available. These include nets for survey, convoy control, and security.

(2) External.--The following nets are entered as required:

(a) Battalion command net.

(b) Battalion fire direction net.

(c) Artillery air spot net.

(d) Conduct of fire nets of other batteries of parent battalion when directed.

(e) As required by higher and reinforced headquarters.

b. Multichannel Radio Communication System.--In addition to the multichannel radio communications provided by the artillery battalion to the batteries, each 105mm howitzer battery has within its organic table of equipment (T/E) the capability of establishing multichannel radio communications with the headquarters of the infantry battalion to which it is providing forward observers and liaison personnel.

c. Wire Communication System.--In the 105mm howitzer battery, trunk lines are laid between the battery switching center, the supported unit, the parent unit, and the liaison switching center when there is one. Long locals are often necessary between forward observers, the liaison switching center, the battery, and the infantry FSCC. Wire is developed in the battery, as in higher artillery echelons, only to the extent permitted by the personnel, situation, and time available. See figure 49 for a typical system. The 155mm howitzer has trunklines laid from the artillery battalion to the battery.

## Section III. LANDING FORCE COMMUNICATION SYSTEMS FOR FORCE ARTILLERY

## 6301. GENERAL

Artillery units of the landing force may operate directly under landing force control or division control. When attached to a division, force artillery units are normally assigned to the artillery regiment where they may be further attached to an organic artillery battalion. Landing force communication systems for artillery support are integrated with the division and artillery regiment systems to provide a flexible capability of fire control and command.

## 6302. TYPE FORCE ARTILLERY COMMUNICATION SYSTEM FOR ARTILLERY SUPPORT

Headquarters battery, field artillery group, has the capability to serve as landing force artillery headquarters in MAF sized amphibious operations in which the landing force includes two or more principal ground elements with their own organic artillery plus force artillery batteries. The landing force artillery is usually established near the landing force headquarters. The artillery FDC may be located adjacent to the landing force FSOC to simplify communications required for fire support coordination. The communication platoon of the headquarters battery, FAG, is responsible for installing, operating, and maintaining the artillery communication systems.

a. Radio Communication System.--Figure 50 illustrates a type system. Requirements are indicated below:

(1) Internal.--The communication platoon of headquarters provides the equipment and personnel to establish, operate, and maintain the following nets:

(a) Landing Force Artillery Command/Fire Direction Net.--Stations on this net are the force artillery headquarters, field artillery group headquarters, and the artillery regiments of the divisions. This net is utilized to pass administrative and tactical type traffic as well as fire direction and fire control traffic. Counterfire information and missions may be transmitted over this net. When this net cannot sustain both command and fire direction traffic, consideration must be given to activating separate nets.

(b) Landing Force Artillery Air Spot Net.--Force FSOC, field artillery groups, force artillery batteries, division(s) artillery regiments and battalions, and artillery liaison officers, as required, utilize this net. It is the primary means of conducting fire of artillery units under force on targets which are suited to their capability. Search, surveillance, and attack of enemy counterbattery means are requested over this net by the landing force elements and the divisions. This net may serve as a relay station when other means of communication are inadequate between elements of landing force artillery.

(c) As-Required Radio Nets.--The landing force artillery headquarters may activate nets on an as-required basis utilizing available frequencies. These nets normally include:

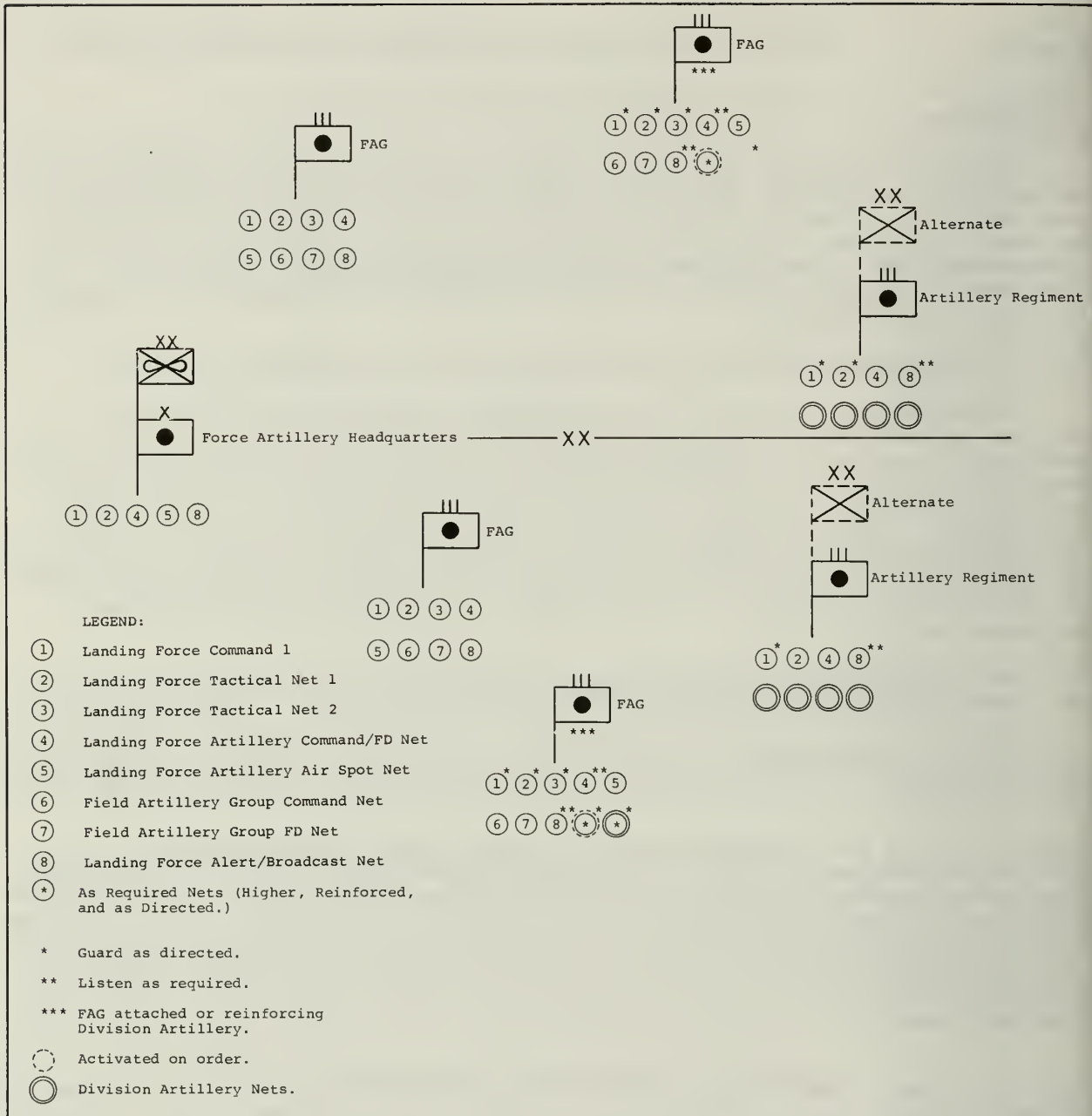


Figure 50.--Landing Force Radio Communications for Artillery Support.

1 Landing Force Survey Net.--Provides a means for communication between survey teams and members of survey teams, and with the survey officer or survey information center, as appropriate.

2 Landing Force Metro Net.--Provides a means by which meteorological data can be transmitted to the artillery with the landing force. Force and division artillery headquarters employ this net to transmit



meteorological data on an established schedule. This net may also be used to coordinate radiosonde frequencies and to schedule soundings.

3 Other.--Nets for artillery intelligence, tactical planning, and fire support coordination may also be activated.

(2) External.--Communication personnel and equipment are provided the force artillery headquarters to enter and operate in the following nets:

(a) Landing force command net 1.

(b) Landing force tactical net 1.

(c) Landing force tactical net 2 is used when the volume of traffic necessitates its activation or when directed by higher authority.

(d) Landing force alert/broadcast net is entered whenever force artillery CP and landing force CP are situated at a distance from each other.

(e) Damage control net (as required).

b. Multichannel Radio Communication System.--The artillery headquarters has for the landing force the organic equipment to enter the landing force headquarters multichannel radio system. Four channels of telephone and teletype communications can be established between landing force artillery headquarters and the division(s) artillery regimental headquarters with both units using organic equipment. (See fig. 51.)

c. Wire Communication System.--The wire section of the headquarters battery, FAG, will install and operate a switching center within the landing force artillery headquarters. Trunks provide interfacing between the artillery and infantry multichannel systems, as appropriate. Fire direction and command wire lines may be installed to the FSC artillery units located in the vicinity of landing force artillery headquarters. The wire section of the headquarters battery, FAG, also installs the wire facilities required by the force FSCC. (See fig. 51.)

#### 6303. TYPE COMMUNICATION SYSTEM OF THE FIELD ARTILLERY GROUP

In many situations, force artillery units may find it necessary to operate in division artillery nets while under control of force artillery headquarters and, at the same time, operate in landing force nets.

a. Radio Communication System.--Figure 52 portrays a type system. Requirements are:

(1) Internal.--Communication personnel and equipment are provided from the communication platoon of the FAG headquarters battery to establish, maintain, and operate the following internal radio communication nets:

(a) Field Artillery Group Command Net.--This net provides the commander with the means to exercise command and control of subordinate units. Administrative and logistical traffic is passed over this net and it may be used as an alternate fire direction net when required. Stations on the net include FAG headquarters, FDC, and subordinate batteries.

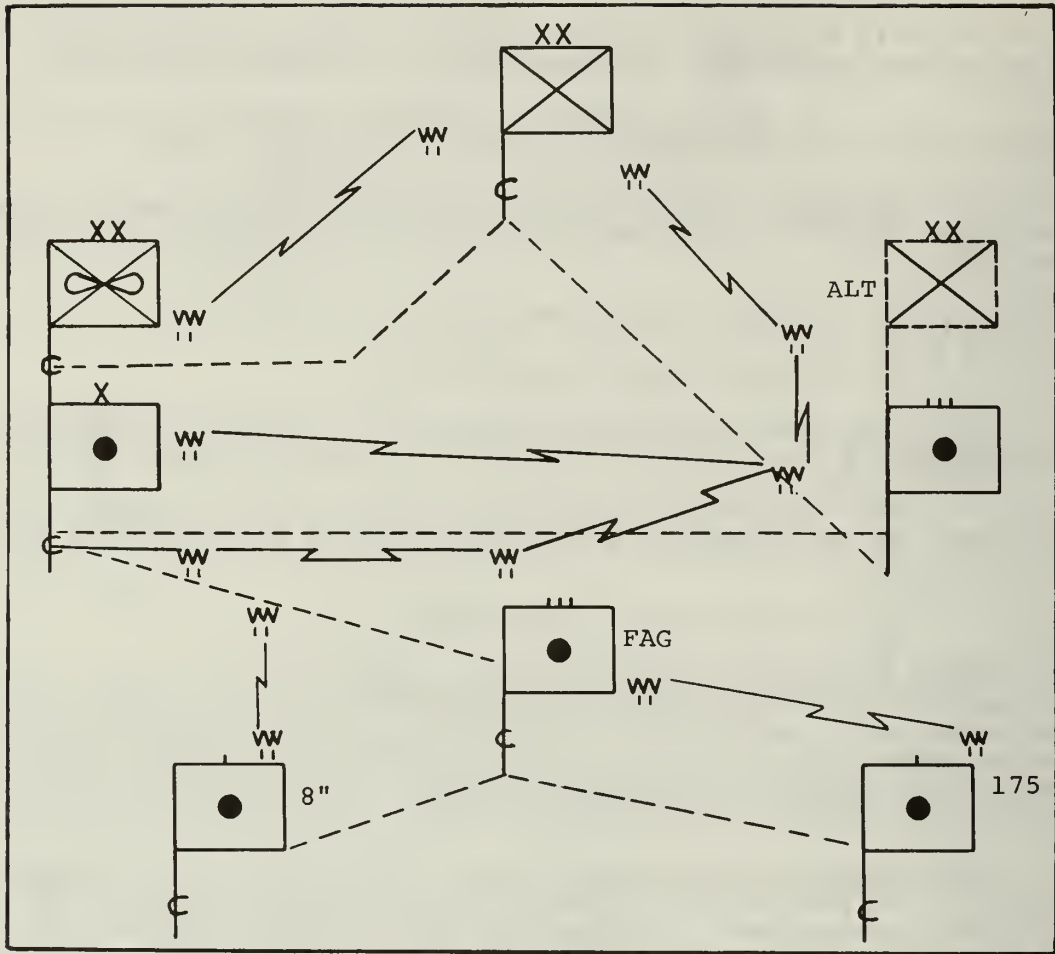


Figure 51.--Landing Force Wire-Multichannel Radio for Artillery Support.

(b) Field Artillery Group Fire Direction Net.--The field artillery group FDC and FDC's of subordinate units constitute the stations on this net. Tactical fire orders, request for reinforcing fires, and fire commands may be transmitted over this net.

(c) As-Required Nets.--Some of these nets may be used for the purpose of transmitting and receiving specialized data and information from radar, tactical and counterbattery intelligence, survey, and meteorological sections. These nets are activated only when normally established nets are unsuitable for the purposes required.

(2) External.--Communication personnel and equipment are provided by the headquarters battery, FAG, to enter and operate in the following external radio nets:

- (a) Landing force command net 1.
- (b) Landing force tactical net 1.

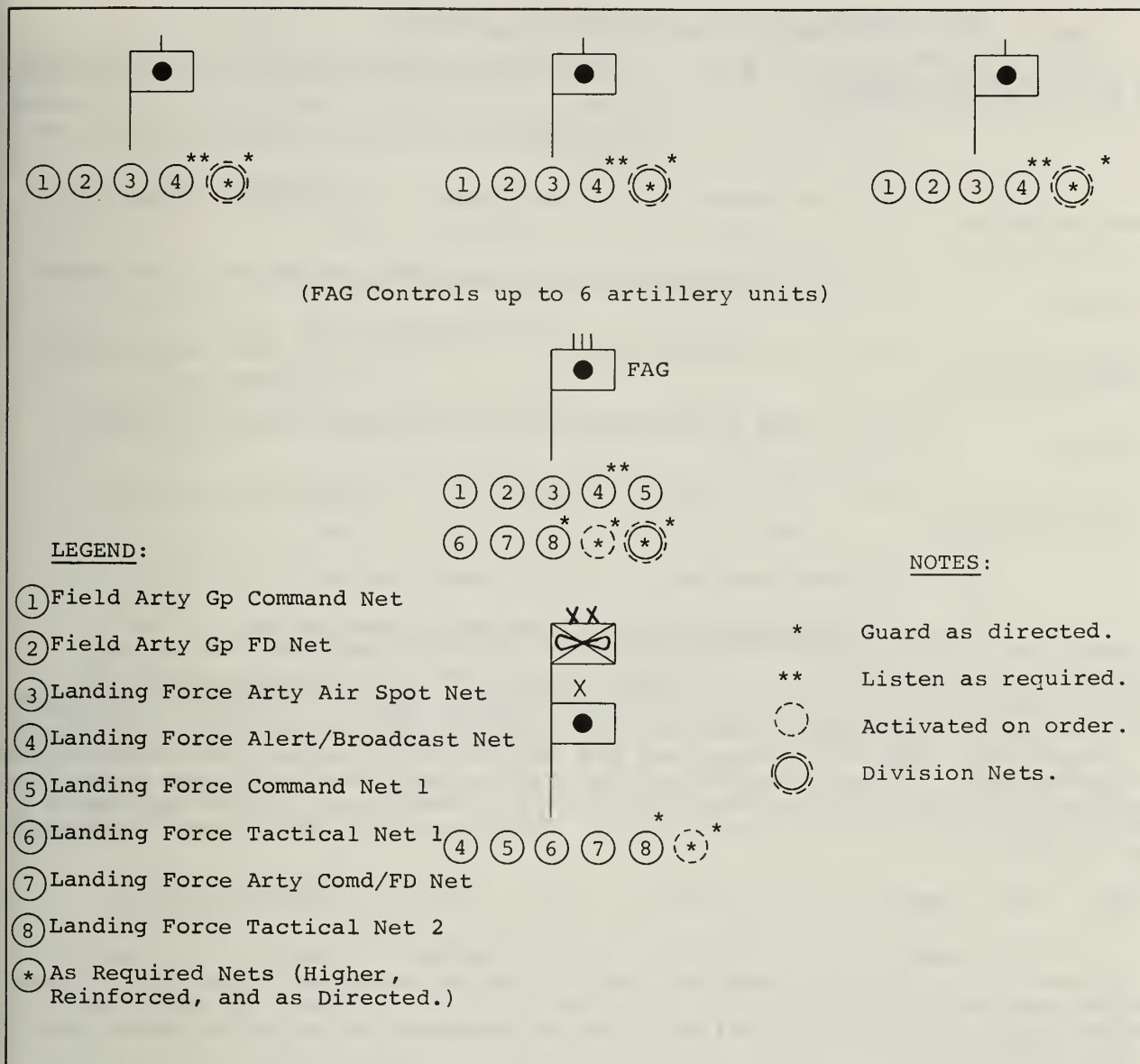


Figure 52.--Field Artillery Group Radio Communications.

- (c) Landing force artillery command fire direction net.
- (d) Landing force artillery air spot net.
- (e) Landing force alert/broadcast net.
- (f) As-required nets of higher headquarters.

b. Multichannel Radio Communication System

(1) The field artillery group multichannel radio system provides a direct link between:

(a) Landing force headquarters and FAG headquarters.

(b) FAG headquarters and division artillery regiment(s) headquarters.

(c) FAG headquarters and the 175mm gun battery (SP) headquarters.

(d) FAG headquarters and the 8-inch howitzer battery (SP) headquarters.

(e) 175mm gun battery (SP) headquarters and the firing battery.

(f) 8-inch howitzer battery (SP) headquarters and the firing platoons.

(2) Teletype equipment is also installed in this system.

c. Wire Communication System.--The wire communication system is installed by the communication platoon of the FAG headquarters battery depending on the situation, distance between units, personnel, and equipment available. The required locals and trunks between stations and switchboards in the FAG command post are installed as soon as possible. Trunklines between the FAG headquarters and the artillery batteries are installed as permitted. Whenever subordinate units are in proximity of the group CP and operating under FAG control, lines will normally be laid to provide a more reliable means of communication. Radio nets are duplicated insofar as possible.

6304. TYPE COMMUNICATION SYSTEMS OF FIELD ARTILLERY GROUP BATTERIES

The communication systems of the batteries are similar insofar as the type nets utilized; however, they differ in number and stations. These units must be capable of operating under a field artillery group either under landing force or division artillery headquarters or as separate batteries attached to division artillery elements. Wire communications are developed, as in all other artillery units, according to the situation. The required locals to the firing battery and firing platoons, FDC's, command, and service elements are installed. When the battery is proximate to the parent headquarters, wire is installed as directed by the commander and his communication officer. Multichannel radio facilities are installed between the firing battery and the headquarters battery. The FAG multichannel radio system provides interface to the division artillery regiment and the force system. Only radio communications are discussed below; however, as with all artillery units, these nets are duplicated by wire or multichannel radio systems to the degree permitted by the situation.

a. Battery Concept Communication System.--Since this system envisions the firing battery controlling the fires of individual weapons/platoons, the system does not provide platoon nets. Individual pieces and platoons may be assigned missions apart from the firing battery; however,



they are controlled over the battery nets if the distance and area of operation permit. When operating at a distance or in difficult terrain, augmentation of communication personnel and activation of platoon nets may be necessary. The following internal and external communication nets are normally operated by personnel of the battery:

(1) Internal

- (a) Battery command/fire direction net 1.
- (b) Battery command/fire direction net 2.
- (c) As-required nets.

(2) External

- (a) Field artillery group command net.
- (b) Field artillery group fire direction net.
- (c) Landing force alert/broadcast net.
- (d) Landing force artillery air spot net.
- (e) As directed by higher headquarters.

b. Platoon Concept Communication System.--The communication system is designed to control the unit administratively and tactically at the battery and/or platoon level. Complete communication systems are provided to complement the platoon organization and employment. Platoon nets are deactivated when control by the parent battery is established. The following nets are normally operated by the platoons and battery using the platoon concept:

(1) Internal

- (a) Battery command fire direction net 1.
- (b) Battery command fire direction net 2.
- (c) Platoon command fire direction net (platoons only).
- (d) As-required battery nets.

(2) External

- (a) Field artillery group command net.
- (b) Field artillery group fire direction net.
- (c) Landing force artillery air spot net.
- (d) Landing force alert/broadcast net.
- (e) As directed by higher headquarters.



## CHAPTER 7

## ARTILLERY SUPPORT IN AMPHIBIOUS OPERATIONS

## Section I. GENERAL

## 7101. INTRODUCTION

As an integral and vital part of the landing force, artillery participates in all phases of the amphibious operation. The artillery with the landing force must train, plan, and execute the essentials of movement of artillery units; rehearsal with landing force elements; support of the landing whenever possible; and support of the assault and subsequent operations ashore. Artillery techniques in the amphibious operation differ from the normal ground warfare techniques primarily during the planning, rehearsal, movement to the objective area, and the assault phases of the operation. Many of the normal planning and tactical techniques are utilized or slightly modified while others are peculiar to the employment of artillery in the amphibious operation. Planning of the amphibious operation is covered in chapter 1, section IV. This chapter stresses the artillery techniques and considerations in the rehearsal, movement, landing, and subsequent operations ashore. The employment of artillery in amphibious raids, demonstrations, or withdrawals utilizes techniques that do not differ materially from those of the primary operation presented in this chapter.

## 7102. CONSIDERATIONS

Certain considerations peculiar to artillery employment in the amphibious operation must be resolved during the planning phase. The artillery commander and his staff carefully analyze the area of operations, the situation, the logistic support available, and the concept of operations in the development of staff estimates for the commander landing force. (See pars. 1405 and 1406.) These considerations include:



a. Aggressiveness

(1) The artillery supporting the landing force must be employed with boldness and imagination in the amphibious assault, avoiding stereotyped and predictable patterns. The factors normally considered as basic to the security of artillery units in land warfare must often be sacrificed in the amphibious assault. The absolute necessity for the early entry of artillery into combat to provide essential fire support to the maneuver force will frequently cause artillery units to be placed in proximity to various other units resulting in crowding and highly vulnerable position areas. The absence of defiladed position areas or the completion of protected gun positions cannot cause the delay of the entry of artillery into combat. Nevertheless, artillery units should not be landed or committed to action in areas subjected to intense small arms fire. Various field expedients based on experience may be required to substitute for the normally accepted means of accomplishing essential tasks. Artillery forward observer teams must be capable of requesting and adjusting naval gunfire especially during that period prior to the landing of the artillery. The talents of the shore fire control parties are exploited in the requesting, adjusting, planning, and coordinating of artillery fires when the maneuver elements have advanced beyond the range of the naval gunfire support ships, or if/when gunfire ships are not available. The various means such as helicopters, landing craft, LVTP's, causeways, etc., should be planning for the landing and displacement of the artillery.

(2) Fire support of the landing force may be provided by artillery firing from offshore islands in situations created by the characteristics of the area and the peculiar circumstances of a particular amphibious operation. Care must be taken in planning for the use of offshore islands by artillery. The problems of securing the island by a maneuver force, embarkation of the artillery, availability of landing craft/helicopters, buildup and maintenance of ammunitions levels, and eventual shore-to-shore movement must be balanced against the anticipated increase in firepower available to the landing force. Other fire support means such as naval gunfire support and aviation support must be exploited to the maximum. If there still remains an insufficiency of fire support, and no increases in naval gunfire or aviation support can be acquired, then the use of offshore islands, when available, should be considered.

b. Concept of Fire Support.--In stating his concept of operations, the commander landing force states his requirements for fire support. These requirements are the considered opinion of the commander, normally based on the recommendations of his artillery commander. A concept of fire support is generally developed from the artillery estimate of supportability as well as the staff estimates provided by the air and naval gunfire agencies. It is a statement of the broad outline of the commander's intent in regard to the provisions for supporting fire for the landing and the subsequent operations ashore.

c. Concept of Logistic Support.--To provide the most effective employment of artillery, the concept of logistic support must complement the concept of fire support. It is based on the capability of the combat service support elements of the landing force as well as the concept of the operation. Consideration must be given to the ammunition, maintenance, replacement, and resupply problems envisioned during the amphibious operation. The logistic capabilities of the artillery organization must be exploited to overcome the problems which arise prior to the landing of and



installation of the combat service support elements of the landing force ashore.

d. Organization for Combat.--The organization for combat is derived with consideration of the principles contained in chapter 5. The separation of tactical units that often characterizes amphibious operations may require attachment of artillery units or certain of their elements to BLT's and RLT's. When the landing force is comprised of a single division or lesser unit, the artillery assigned to the landing force will normally be attached to the senior artillery headquarters. When the landing force controls two or more ground combat elements, a separate landing force artillery headquarters is generally required.

e. Organization for Embarkation.--The organization for embarkation must facilitate the concepts of the operation, fire support, and logistics to the extent that entry into combat, effective fire support, and sustained operations can be accomplished. (See sec. II.)

f. Type of Control.--The organization for combat should permit the maximum practicable degree of centralized control consistent with the commander's concept. The necessity to attach units and elements to assault maneuver BLT's and RLT's requires that flexibility of control exist and that varying degrees of centralized and decentralized control be exercised over subordinate artillery units. Artillery commanders do not hesitate to decentralize control when it will accelerate entry into action, permit more effective employment, or when necessitated by the situation. Reestablishment of centralized control at the earliest possible time and at the highest artillery level is sought.

g. Fire Support Coordination.--Coordination of supporting arms is particularly difficult during the initial assault and until the landing area has been sufficiently expanded to permit a sufficient area for maneuvering fire support means. Due to the density of units, extra care is required to preclude violation of control measures such as boundaries, fire coordination lines, fire support coordination line, and no-fire lines. It is here that the extensive coordination of fire support plans, carried out in the planning phase, serves its purpose.

h. Communications.--A comprehensive communication plan is issued by battalion and higher artillery units to ensure effective communications during the critical period of the assault and subsequent operations ashore. (See sec. IV.)

#### 7103. SUBSIDIARY LANDINGS

The inability of artillery to support the initial phase of an amphibious assault constitutes its greatest limitation. As discussed in paragraph 7102, the installation of artillery on offshore islands or promontories for support of landing operations may be desirable or required. Subsidiary landings for the purpose of seizing suitable position areas may be conducted when such islands or land areas are located within artillery range of hostile defenses. Subsidiary landings are planned and conducted with the same care as the main landing and may be executed by various means. They may be conducted by the advance forces or with support of the entire amphibious task force.

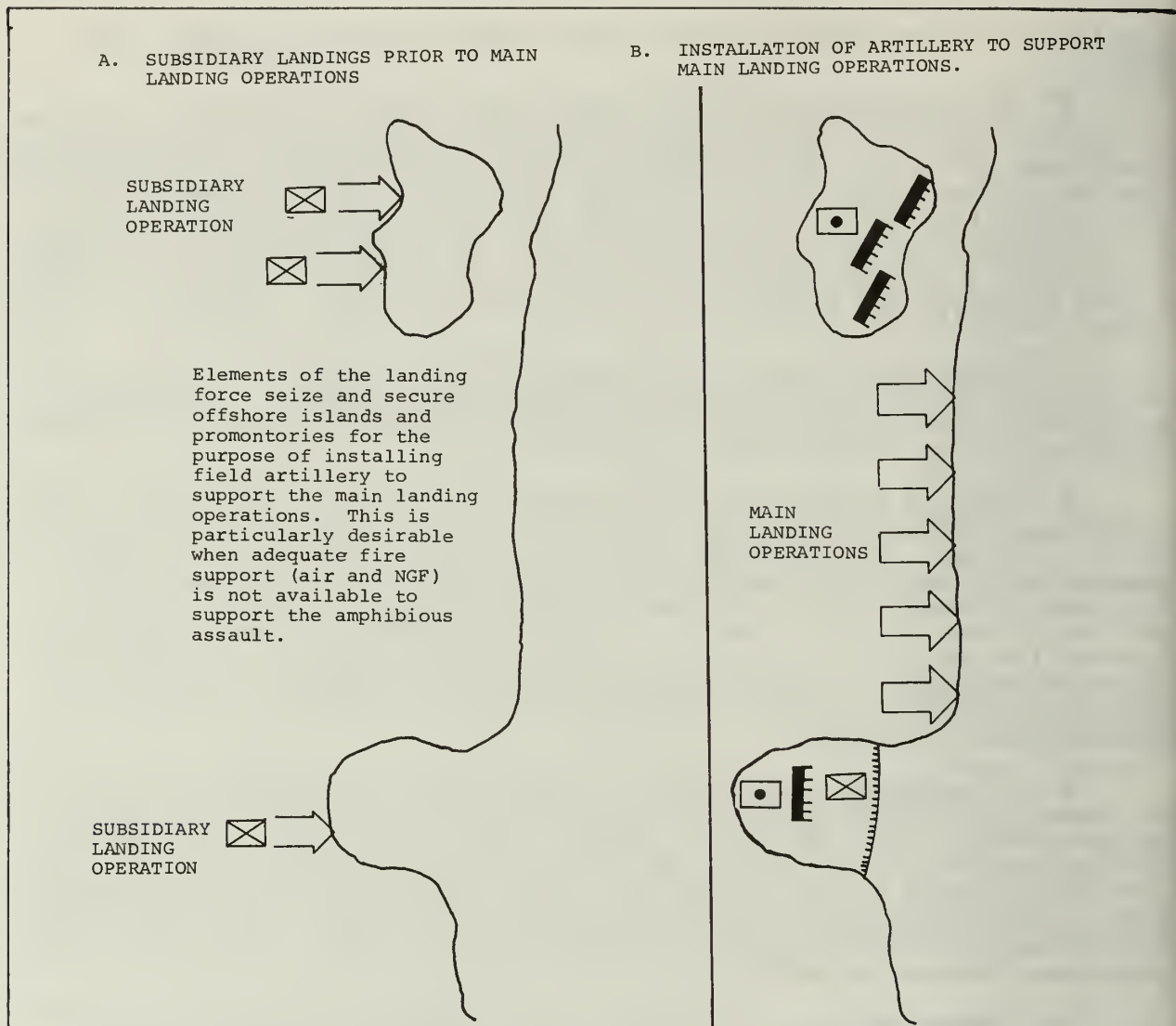


Figure 53.--Subsidiary Landing Operations.

a. Seizure Prior to Main Landing.--When the seizure is made prior to the main landing (see fig. 53), the element of surprise is generally sacrificed; however, the additional fire support may contribute a greater measure of ensurance of success to the amphibious assault of the beach. This is particularly true when insufficient naval gunfire is available or the loss of gunfire support ships may occur during this critical phase.

b. Seizure Subsequent to Main Landing.--Subsequent seizure of areas for installation of artillery by subsidiary landings may be made either by ship-to-shore or shore-to-shore techniques. Seizure of such positions is generally desirable to provide support not otherwise available, to deny these areas to the enemy, to deceive and demoralize the enemy, and to lend impetus to the landing force's attack.

c. Planning of Subsidiary Landings.--Diversion of elements of the landing force for subsidiary landings is justified when the value of the operation is more significant than their contribution would be if committed to the main landing or attack. Additional planning for displacement, resupply, and linkup or rejoining of artillery occupying position areas seized in subsidiary landing operations must be planned to ensure continuous and uninterrupted fire support for the main landings and subsequent operations ashore. The loss or reduction of artillery support may occur for the period of displacement; i.e., time necessary to embark, land, and emplace the units involved. The commander landing force may, however, overcome this limitation by including in the artillery organization for combat, when available, the necessary additional units to participate in any foreseeable subsidiary landings and the purpose which these landings serve.

#### 7104. REHEARSAL

The purpose of rehearsals is to test the adequacy and familiarity of all echelons of the landing force with plans, timing of detailed operations, combat readiness of participating forces, and communications.

a. Planning.--The planning should ensure that the rehearsal will adequately accomplish its purpose.

b. Briefing.--Prior to the rehearsal, detailed briefings should be held to ensure thorough understanding of the artillery plans. Artillery personnel, such as forward observer and liaison teams, who are embarked with maneuver units must be briefed prior to the embarkation.

c. Type of Rehearsal.--The type of rehearsal(s) conducted will determine what elements, personnel, and materiel will participate. Integrated rehearsals normally include artillery personnel at all levels. This is the opportune time to test artillery communications between forward observers, artillery command groups, and fire support coordination and fire direction agencies. Normally, artillery weapons are not landed.

d. Critique.--Primary consideration is given to an evaluation of communications, special techniques, and time-space factors. If the critique is conducted ashore, it is advisable to include artillery forward observers and liaison officers. This will enable them to be fully aware of any changes to the artillery plan and to provide additional commentary.

#### 7105. MOVEMENT TO THE OBJECTIVE AREA

The movement to the objective area is that period of time between the departure of the amphibious task force from the points of embarkation to the arrival of components of the amphibious task force in their assigned positions in the objective area. This movement may be via the rehearsal, staging, and/or rendezvous areas.

a. Communication Security.--Communication silence is normally imposed during movement to the objective area. Communication restrictions impose a limitation upon the artillery commander in that he will not possess organic communications with personnel embarked in other shipping. Adequate opportunity will be given prior to the landing of the artillery for testing organic equipment and nets. Briefings and indoctrinations on communication security must be given to artillery personnel prior to embarkation.



b. Training.--Emphasis is placed on combat orientation, indoctrination, and briefing in all aspects of the operation. Physical drill should be conducted daily to the extent the ship facilities will permit. Artillery personnel should be briefed as to the landing plan, scheme of maneuver ashore, location of likely position areas, zones of fire, and road networks. Dominating terrain features that may provide orientation, location of artillery installations, or a degree of protection from enemy fire and observation should be stressed. Technical training is conducted commensurate with the space and facilities available to the artillery unit.

c. Maintenance.--Equipment and materiel must not be allowed to deteriorate during the movement; carefully supervised maintenance is performed throughout the movement. Dampness and salt water require that special care and cleaning be given weapons, communication equipment, vehicles, and supplies while underway.

d. Discipline.--Discipline problems are normally of minor consequence during the movement to the objective area; nevertheless, necessary action to enforce discipline must be taken.

#### 7106. OPERATIONS AND INTELLIGENCE EN ROUTE

During the movement to the objective area, the commander and his staff continually review the plan of operations and fire support in light of newly acquired information and intelligence. Current artillery intelligence is provided by reconnaissance activities, the supporting arms coordination center (SACC), and higher headquarters. Recommendations for changes in the artillery plan may be made in light of intelligence relating to the characteristics of the objective area, enemy situation, enemy capabilities, or as dictated by modifications required in the scheme of operations. The planning for destruction of additional targets or the deletion of targets destroyed by other fire support means are accomplished based on target assessments and information provided by the SACC representative. A continued program of counterbattery intelligence should be carried out at all levels of artillery in order to provide adequate counterfire measures and the required tactical disposition of firing units. Review of the artillery plan in respect to any foreseen eventualities and the action that would be necessitated is made throughout the movement to the objective area. Loss of shipping with artillery units embarked requires reassignment of tactical missions and modification to the landing plan.



## Section II. EMBARKATION

## 7201. GENERAL

This section presents the principles and techniques involved in the embarkation of artillery for amphibious operations. This section supplements embarkation planning considerations set forth in FMFM 3-1, Command and Staff Action, and detailed procedures set forth in FMFM 4-2, Embarkation. Embarkation requires careful attention to details in planning and execution.

## 7202. ORGANIZATION FOR EMBARKATION

a. Techniques of Embarkation.--The following techniques will generally be observed in the organization and execution of embarkation of artillery units:

(1) Artillery organizations normally are formed together for embarkation. Artillery units attached to other organizations of the landing force are embarked with the organization to which attached.

(2) The artillery regiment normally is the nucleus for embarkation of artillery.

(3) When landing force artillery units are assigned to the division for embarkation, they normally are specifically assigned to the artillery regiment for embarkation.

(4) Regardless of the organization for embarkation and combat, the following personnel are embarked with other elements of the landing force:

(a) Fire support coordination center personnel are embarked with the supported infantry unit.

(b) Artillery aerial observers are normally embarked with the aircraft or helicopters that support the operation.

(c) Liaison teams provided to the supported infantry units are embarked with the headquarters of those units.

(d) Forward observer teams are embarked with the units which they support.

(e) Reconnaissance parties are embarked so that they can most expeditiously accomplish their mission.

b. Embarkation Unit.--An embarkation unit usually is built around the artillery organization of the division. When the landing force is an MAF, embarkation units may be necessary for the field artillery group as well as for the artillery regiment. (See FMFM 4-2, Embarkation.)

c. Embarkation Team.--The embarkation team consists of the troops, equipment, and supplies embarked in a single ship. Artillery weapons, prime movers, and their crews are loaded in the same ship to facilitate training and maintenance while underway. Helicopterborne artillery may be

loaded aboard the LPH/LHA with the supported infantry unit or transferred to the LPH/LHA prior to landing operations. Units must be loaded in a manner which permits unloading according to the tactical plan. (See FMFM 4-2, Embarkation.)

#### 7203. EMBARKATION RESPONSIBILITIES

The estimate of artillery requirements provides the basis for preliminary determination of shipping requirements. The final determination is based on recommendations submitted by the artillery units, included in the totals of shipping requirements for the landing force, and presented to the commander amphibious task force (CATF). (See FMFM 4-2, Embarkation.)

#### 7204. SHIPPING REQUIREMENTS

Requirements are determined by the artillery unit commander based upon the landing plan; amount of artillery, ammunition, supplies, and equipment; and number of personnel.

a. Helicopterborne Artillery.--Should normally be embarked in LPH/LHA or LPD type shipping.

b. Waterborne Artillery.--Normally embarked in LHA, LPD, LSD, or LST type ships. When it is desired to land artillery by landing craft, equipment should be preloaded in these craft and embarked in the well decks of the LHA's, LSD's, or LPD's. The 1179 class LST's have the capability of beaching under ideal conditions of surf and beach gradient. If conditions do not permit beaching, offload may be accomplished via causeway, causeway ferry, or LCU. Weapons should not normally be loaded in LPA or LKA type ships unless shipping limitations dictate that these ships be used.

c. Loading Details.--Should be obtained from individual ship's characteristics pamphlets. As early as possible in the planning, an inspection is made of stowage areas, holds, and decks to ensure that data contained in the ship's characteristics pamphlet is correct.

d. Loading Plan.--Prepared by the team embarkation officer, assisted by the ship's combat cargo officer when possible, and is under the supervision of the embarkation team commander. The embarkation team commander and ship's commanding officer approve the loading plan before loading commences; they approve changes required thereafter. (See FMFM 4-2, Embarkation.)

#### 7205. EMBARKATION OF FIRING UNITS

The organization for embarkation should preserve, to the maximum extent possible, the tactical integrity of task units as established in the organization for combat and should facilitate their early entry into combat. Artillery elements in direct support, or attached, are embarked with the supported unit. Batteries and battalions in general support are usually organized as separate embarkation teams to facilitate control. Dispersion of firing elements in assault shipping provides a measure of security against losses at sea. This dispersion should be carried out only to the extent that control of units is not unduly hampered.

a. Loading Considerations.--The following considerations should receive special attention:

(1) Materiel must be accessible for maintenance.

(2) Prime movers are to be stowed with the artillery pieces.

(3) Slings for artillery pieces and vehicles must be carefully adjusted to prevent damage to the equipment.

b. Landing Considerations.--Early entry into action is ensured by embarkation of light artillery on LPD's, LPH's, LSD's, or LHA's for movement ashore by helicopter or in preloaded landing vehicle or craft. Medium and heavy artillery units can normally enter combat at the required time by landing from LST's. Flexibility is necessary. The following considerations should receive special attention:

(1) Reconnaissance parties are landed early.

(2) The composition of reconnaissance parties should provide for the establishment of survey control, communications, selection of position areas, beach exits, and route guides and marking.

(3) Firing units, fire direction, and command elements should be loaded to expedite emplacement and to provide centralized fire direction at the earliest possible time.

(4) Organic elements such as survey, meteorology, and radar are embarked to provide for their earliest employment.

(5) Security and control of the movement from the beach to position areas must be provided.

(6) Measures necessary to ensure rapid off-loading and prevent overcrowding the beach area.

(7) An alternate plan to include assembly areas or alternate position areas.



## Section III. AMPHIBIOUS ASSAULT

## 7301. GENERAL

Artillery units are landed as soon as conditions on the landing beaches and/or in the landing zones permit. Reconnaissance parties must be allowed sufficient time to complete essential tasks before firing units are landed. Artillery units, whether supporting a surface assault or a helicopter assault, are normally landed as "on-call" serials in most operations, thus giving the artillery commander flexibility in determining the actual time of landing. On-call artillery serials are normally landed on order of the commander landing force, based upon the recommendation of the landing force artillery officer.

## 7302. SHIP-TO-SHORE MOVEMENT

Artillery units must be prepared for an early landing and entry into action; however, they must not be landed until position areas are cleared of intense small arms fire which would interfere or even preclude the providing of continuous artillery support for the assault units. Certain elements of artillery units must land prior to the artillery weapons. These elements include the forward observation teams and liaison teams which are embarked with the supported infantry organizations. Reconnaissance parties, including survey and communication personnel sufficient to expedite the reconnaissance and selection of positions, are scheduled early in the landing sequence of artillery elements.

a. Surface Landed Artillery.--The time of landing artillery units depends upon such variables as availability of position areas, requirement for artillery ashore, and the ability to beach the larger landing craft and landing ships. The exact place of landing is contingent upon such factors as beach conditions, beach exits, and road nets to the position areas. The normal sequence of landing is discussed below:

(1) Observer and Liaison Elements.--Forward observer teams land with their supported rifle companies and liaison personnel land with the BLT and RLT command groups. These personnel keep their artillery commanders informed of the situation ashore including suitable landing beaches, exits from the beaches, and condition of preselected positions areas, and make appropriate recommendations.

(2) Reconnaissance Elements.--Artillery reconnaissance parties, normally in on-call waves, should be landed as early as the tactical situation ashore permits. These parties are composed of battery and battalion commanders, communication personnel, survey personnel, guides, and sufficient personnel to provide initial local security.

(3) Firing Elements.--As soon as possible, battery and battalion commanders request that their units be landed. For early entry into action, commanders must estimate time and space factors involved and initiate their request in advance of the anticipated time that position areas are expected to be suitable for occupation.

(4) Headquarters and Other Elements.--After firing units are ashore, the vehicles, supplies, and personnel still afloat are phased into the position areas and command posts as soon as practicable.



(a) Communications.--The normal nets utilized in the displacement of a unit ashore are generally sufficient to control the ship-to-shore movement. (See FMFM 10-1, Communications.)

(b) Ammunition.--Ammunition is initially delivered directly to firing units. Designated amphibious vehicles, after landing the firing units, may be utilized to transport ammunition directly from ships to position areas.

(c) Transportation.--A means for displacement of firing elements should always be provided.

b. Helicopterborne Artillery.--In order to facilitate planning and execution, helicopterborne artillery is normally attached to the supported infantry. The sequence of landing artillery elements is discussed below. Techniques are similar to normal operations ashore. (See FMFM 3-3, Helicopterborne Operations.)

(1) Observer and Liaison Elements.--The forward observer teams and liaison parties land with the supported infantry units.

(2) Reconnaissance Elements.--The reconnaissance party must land as early as possible and is usually included in one of the early scheduled helicopter waves. Reconnaissance parties are capable of performing only the minimum reconnaissance tasks.

(3) Firing Elements.--The firing unit may be on-call or scheduled in a helicopter operation. The artillery commander may make recommendations to delay or move up the time of landing according to the situation in the landing area. Alternate landing zones and position areas are considered to prevent delay of fire support. Gun positions should be located at a sufficient distance from landing sites to prevent interruption of artillery or helicopterborne operations.

(4) Other Elements.--The remaining elements are landed as soon as practicable and as the tactical situation permits.

(a) Communications.--The artillery commander does not have adequate communication means to control his unit during the helicopterborne ship-to-shore movement. The time required for the helicopterborne movements is of relatively short duration; therefore, the limitation of communications is acceptable for this brief period.

(b) Ammunition.--Priority must be given to the movement of an adequate initial supply of ammunition. Resupply flights by the helicopters continue until the specified prescheduled load is reached. This ammunition level is maintained by timely request or automatic ammunition resupply flights. Additional quantities of ammunition are palletized in helicopter loads and ready on an on-call basis shipboard or at designated ammunition supply point(s) in the beachhead. Ammunition is delivered by helicopter to the position crew until ground transportation is available to the artillery unit for moving it.

(c) Transportation.--Helicopterborne operations normally limit the amount of organic vehicular transportation lifted. The supported helicopter force to which the artillery unit is attached should be aware of

the artillery's transportation requirements and provide such additional means that are within the force capability. Whenever linkup operations are contemplated, organic artillery transportation, equipment, and personnel which were not helicopter lifted into an area of operations are brought overland.

### 7303. CONTROL

Control of artillery becomes decentralized at the time of embarkation and remains so during the movement to the objective area. Preparations must be made for the resumption of centralized control as soon as practicable after arrival in the objective area.

a. Ship-to-Shore Phase.--Following reconnaissance, the artillery battalion commander requests to the division artillery commander, over the artillery command net, that his battalion be landed. The artillery representative in the tactical-logistical (TAC-LOG) group monitors this transmission as well as the firing units of the battalion which are still afloat. The request alerts the firing units and the TAC-LOG group to initiate preparations to land. The artillery units are ordered to land by the landing force or division commander; however, this authority may be delegated to the landing force (division) artillery commander. The actual order to land comes from the commander amphibious task force to the primary control ship (PCS) and the ships in which the firing units are embarked. Therefore, two orders to land are received--one from the artillery commander to his subordinate commander and to the artillery representative in the TAC-LOG group, and the order from the task force commander to the ships concerned and the appropriate control vessel to land the artillery serials which were requested.

(1) Attached Units.--If an artillery unit is attached to an infantry or other type unit, the commander of the unit to which the artillery is attached issues the necessary orders to land.

(2) Decentralized Control.--In some situations, it may be necessary or desirable to decentralize control to a point which will permit subordinate artillery unit commanders to request directly from the TAC-LOG group that the serials containing artillery elements be landed. Before control decentralized to this degree will function properly, all parties concerned must be fully informed of the following procedures:

(a) Subordinate Commands.--The subordinate artillery unit commander, upon completion of his reconnaissance, requests directly to the artillery representative in the TAC-LOG group that his serials be landed. The TAC-LOG group contacts the appropriate Navy control officer who issues necessary orders to effect the landing of the desired serials.

(b) Nonscheduled Units and Supplies.--Control of the landing of nonscheduled units and supplies may be decentralized to permit subordinate commanders to send requests directly to shore party to land nonscheduled artillery units and supplies. The shore party relays these requests to the TAC-LOG group and the TAC-LOG group notifies the appropriate Navy control officer. The Navy control officer issues the necessary order to land the requested unit and supplies.

b. Initial Control Ashore.--Artillery units with the tactical mission of direct support are the first artillery units to land. The need for

entralized control by the landing force artillery commander during this period is decreased. Therefore, decentralized control is dominant in artillery tactics and techniques during the initial stages of the landing.

c. Subsequent Control Ashore.--To provide centralized control of firing units, it is necessary that the FDC land early, preferably at the same time as the units which it controls. As the artillery units with the tactical mission of general support land, the need for centralized control of artillery is increased. The parent unit FDC's (landing force, field artillery group, and artillery regiment) are established ashore as rapidly as the situation will permit. The degree of centralization is influenced by the capability to communicate and mass fires and the tactical missions of subordinate elements.

#### 7304. INITIAL EMPLOYMENT ASHORE

The initial employment of artillery ashore is influenced by the limitations imposed by the terrain, restrictive position areas, and proximity of multiple maneuver headquarters and command at support installations. Detailed information concerning gunnery is required to ensure accuracy and to facilitate massing fires. The following gunnery and tactical considerations are readily evident:

a. Fire Direction.--Initially, the FDC at the battery and/or battalion is the only echelon(s) capable of centralized control of fire direction. Centralized fire direction is established by the parent unit at the earliest opportunity. Fire direction is facilitated by the proximity of subordinate firing elements which usually result in good, reliable communications.

b. Zones of Fire.--Zones of fire are assigned to ensure coverage of the entire zone of action and to permit massing of fires in critical areas when necessary. Artillery and naval gunfire zones of fire are integrated to ensure complete coverage.

c. Position Areas.--The initial position areas are selected from careful map and photo reconnaissance. The primary consideration in the selection of initial position areas is that each unit must be capable of executing its assigned tactical mission. Alternate position areas are selected and planned in the event the primary area selected cannot be occupied.

d. Gunnery Control.--Detailed information is provided to subordinate units concerning gunnery in artillery orders, annexes, and SOP's.

e. Reconnaissance.--In amphibious operations, artillery commanders employ larger reconnaissance parties in the initial phase ashore than in subsequent operations ashore or during land operations.

f. Target Information.--The artillery representative in the SACC provides the artillery commander with target information and target assessment. During the initial phase, the targets located and fired on are coordinated through the SACC. All target information is duplicated so that the landing force FSCC will have a complete record and target file when control is passed ashore. In addition, all Navy and landing force intelligence agencies and sources are utilized to locate potential artillery targets.



The amphibious task force target list is distributed by the CATF and maintained by target bulletins. The FDC's and the FSCC's at all echelons maintain their lists of targets by use of the periodic bulletins, by liaison with intelligence agencies, and by close review of bomb/gun damage assessment reports. Organic artillery target acquisition agencies are emplaced and begin functioning as soon as possible.

g. Observation.--Artillery aerial observers must utilize aircraft based on board ships until observation aircraft are located on the beach-head.

h. Naval Gunfire.--Close coordination is of particular significance in the initial phase when artillery has not been landed and increased reliance must be placed on naval gunfire support to meet troop requirements for close supporting fires.

i. Counterbattery.--During the early period of the amphibious assault, the artillery regimental (battalion) commander may be assigned responsibilities for counterbattery activity. When the landing force artillery headquarters begins functioning ashore, the primary responsibility for counterbattery activities is centralized at this level.



## Section IV. SHIP-TO-SHORE COMMUNICATIONS

## 7401. GENERAL

The extent of communication requirements will vary with the size of the artillery force involved, the number of units involved, and the echelon of command. The artillery battalions of the divisions, the artillery regimental headquarters, and the force artillery headquarters and their units plan their communication requirements separately but as an integrated and coordinated part of the overall landing force communication plan.

## 7402. EMBARKATION REQUIREMENTS

The senior artillery commander is usually an embarkation unit commander and, therefore, may promulgate the net(s) to be activated. These net(s) are necessary since staging areas, even though proximate to the ships, often encompass an extensive area resulting in difficulty in controlling and exercising of command over embarkation representatives and subordinate commanders throughout the area. These nets will assist

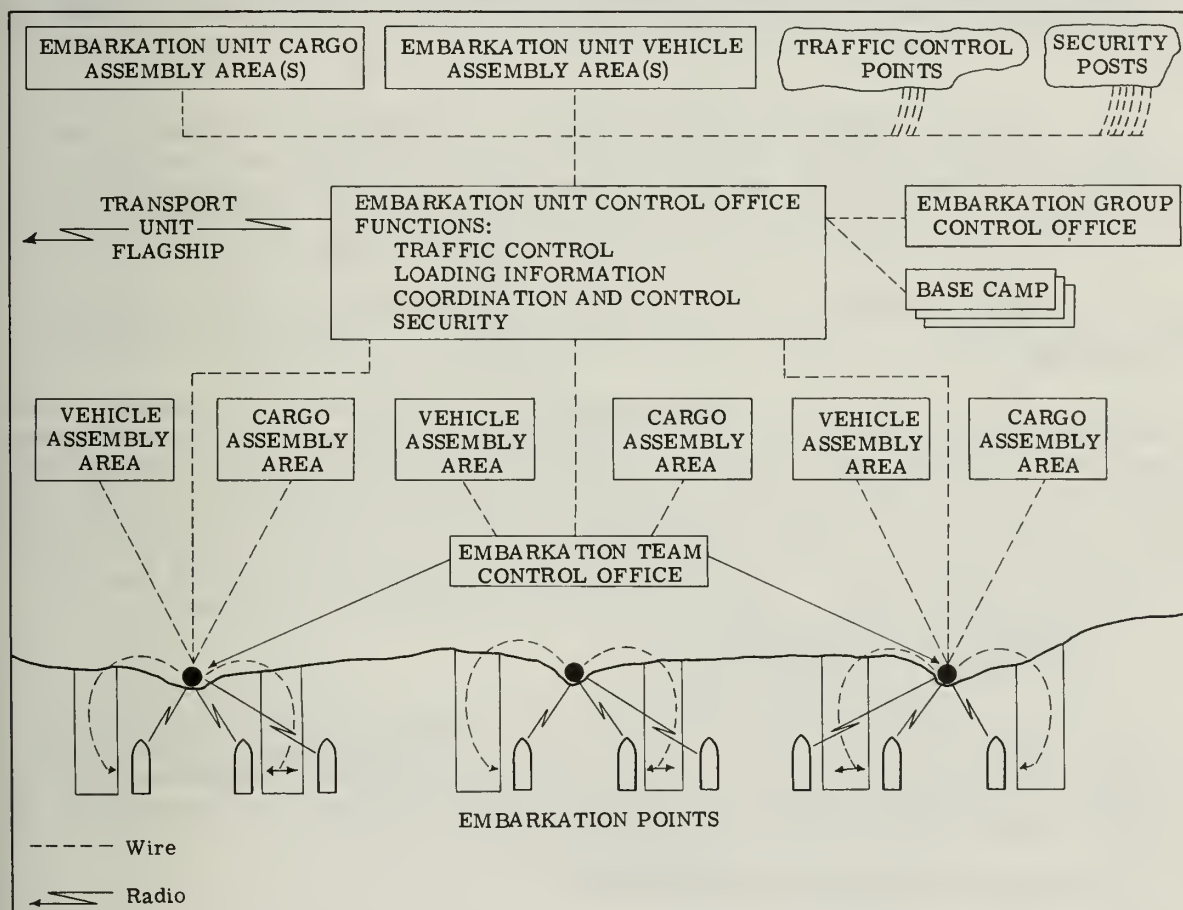


Figure 54.--Communications and Control Within the Embarkation Area.

materially in expediting loading of units and elements. The extent of communications will depend on the number of units involved and ships to be loaded, the location of ships and staging areas, the amount and type of equipment, and the embarkation plan. (See fig. 54.)

#### 7403. OBJECTIVE AREA REQUIREMENTS

The ship-to-shore communication plan in the objective area assures control over units during the entire period afloat, during reconnaissance ashore, during unloading and movement ashore, and by headquarters afloat over subordinate units after their landing and entry into combat. Ship-to-shore communications include requirements to communicate with subordinate elements operating with maneuver units and representatives with the appropriate TAC-LOG group as well as higher and subordinate headquarters. Normally, the radio communication system alone will be adequate during this period. Ship-to-shore communications in the objective area should fulfill the following:

a. Command.--Naval communications may be utilized in part, particularly in operations where decentralized control is exercised. Normally, the command net will be sufficient; however, when excessive administrative and tactical traffic exist, there may be a requirement to activate a tactical net. Multichannel radio facilities may be utilized between subordinate units ashore and headquarters afloat, particularly at the landing force level.

b. Control.--Command and control can normally be exercised over the command and/or tactical net(s) of the artillery echelons involved. Prolonged operations ashore while headquarters remain afloat may dictate the activation of additional nets. In such cases, fire direction net(s) of artillery headquarters may be activated for this purpose.

c. Reconnaissance.--Communication requirements of reconnaissance parties can normally be met by the command nets of their own and parent headquarters.

d. Other.--Artillery liaison officers at the various maneuver echelons activate appropriate nets for transmitting and receiving intelligence, information, planning data, and instructions. Forward observer teams may enter naval gunfire communication nets to conduct fire missions. Artillery aerial observers enter the appropriate air spot net for adjustment of naval gunfire or artillery. Aerial observers may be utilized as relay stations when no other nets exist. Artillery representatives in the SACC monitor all supporting arms nets. TAC-LOG nets are entered as required.

#### 7404. COMMUNICATION READINESS

During the rehearsal, all equipment is activated and the ship-to-shore communication plan is exercised. During the movement to the objective area, radio silence restricts the use of equipment. Upon reaching the objective area and with the lifting of radio silence, all equipment is activated, tested, and repaired as necessary.

#### 7405. DIVISION ARTILLERY COMMUNICATIONS

See figure 55 for a type division artillery ship-to-shore communication system. Battalion and regimental command nets are generally used;

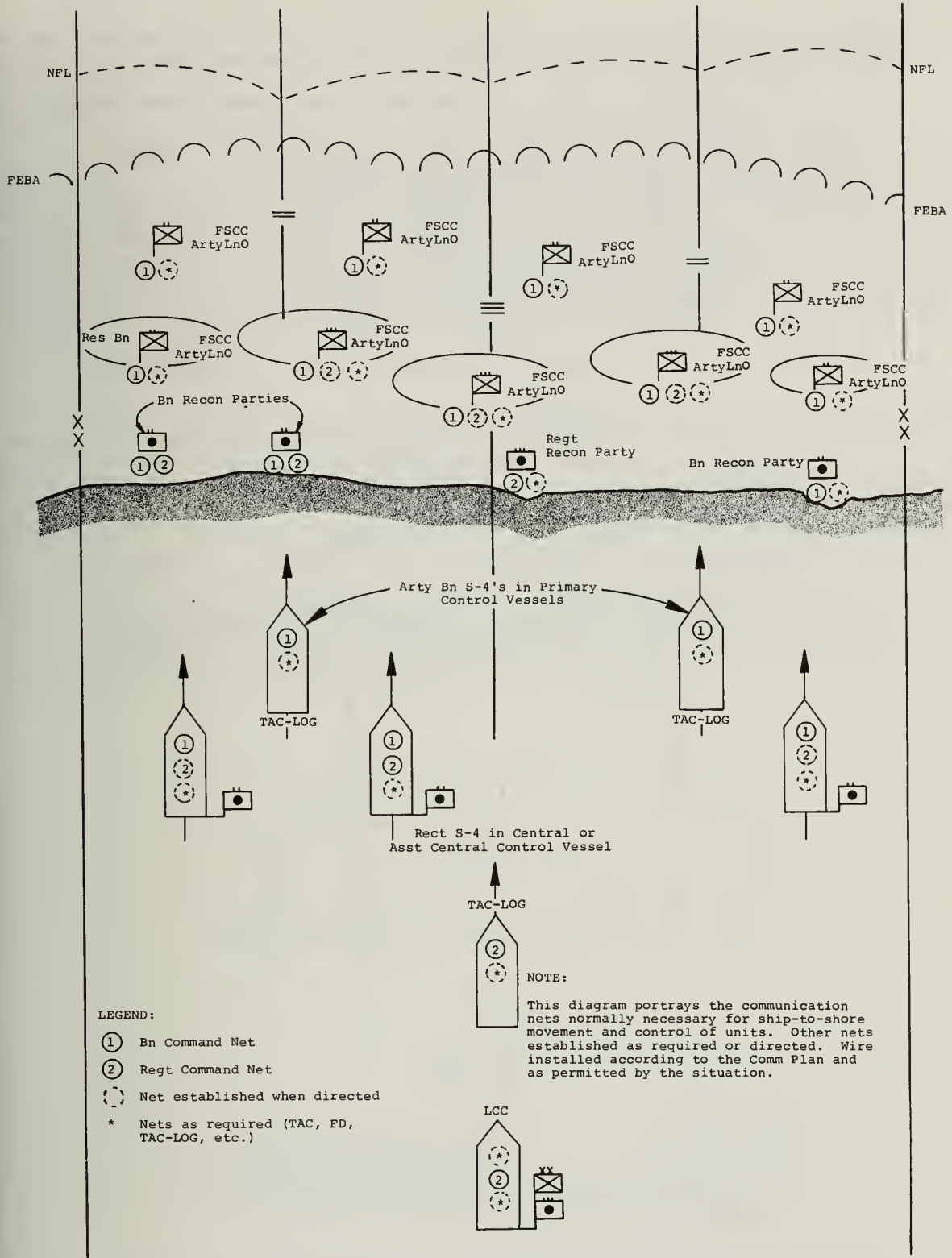


Figure 55.--Division Artillery Ship-to-Shore Communications.

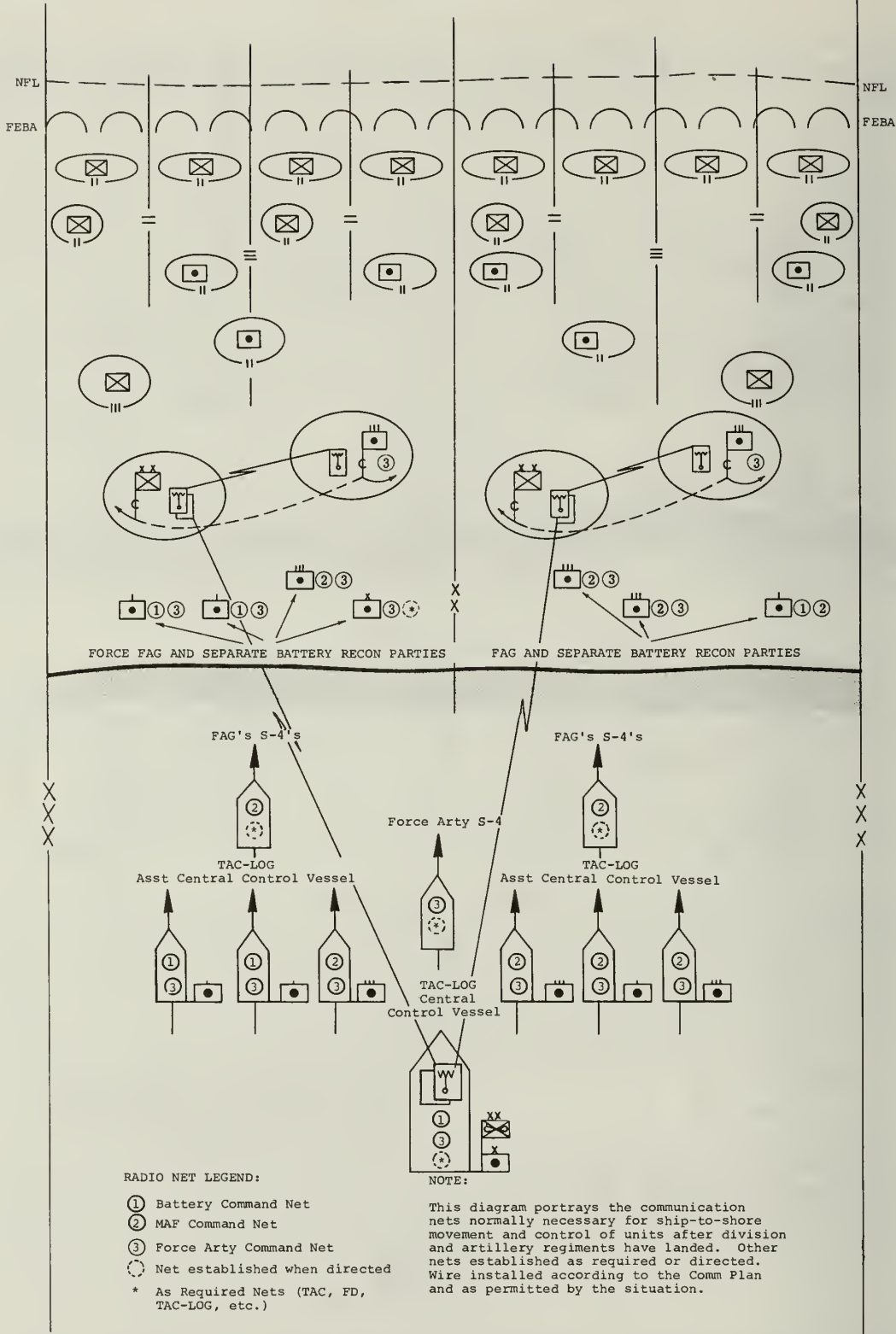


Figure 56.--Force Artillery Ship-to-Shore Communications.



however, the activation of the regimental tactical net may be desirable when the command nets are insufficient to accommodate the traffic.

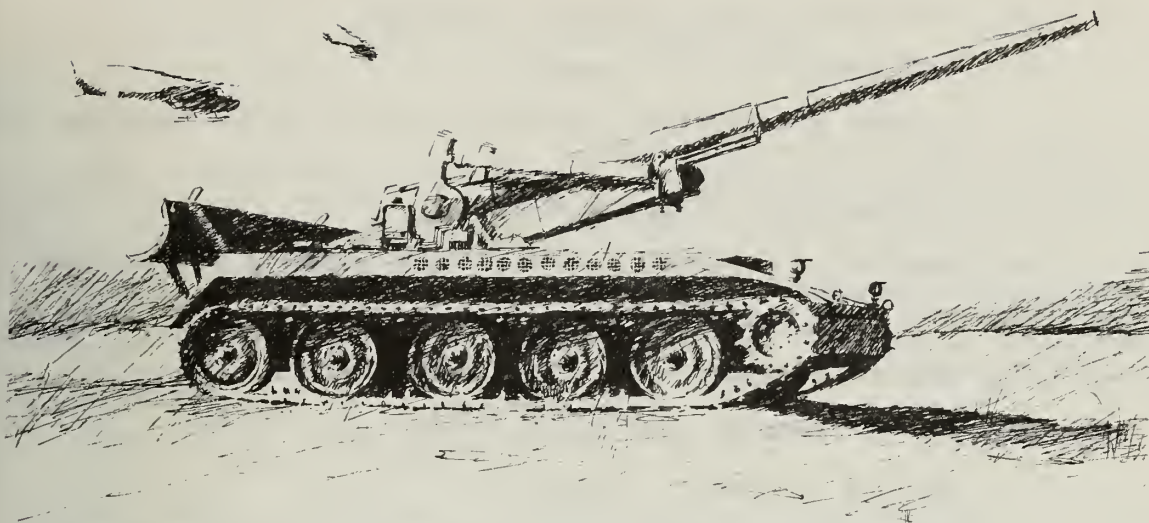
#### 7406. FORCE ARTILLERY COMMUNICATIONS

See figure 56 for a type force artillery ship-to-shore communication system. Field artillery groups, independent artillery batteries, and separate elements establish stations on designated net(s). Representatives of landing force artillery units with TAC-LOG group and other headquarters are also designated as stations on appropriate ship-to-shore net(s). Generally, landing force artillery, field artillery group, and separate battery command nets are utilized to provide the ship-to-shore communication system. Fire direction and other nets may be used when there is a prolonged period between the landing of firing units and their headquarters.

#### 7407. COMMUNICATIONS ABOARD AMPHIBIOUS SHIPPING

Communications for landing force artillery are provided by the Navy on amphibious shipping based on the landing force's stated requirements. The CATF is responsible to provide adequate communications for the landing force. Normally, sufficient channels are available to the Navy's shipboard equipment for command and control of the combat, combat support, and combat service support elements of the landing force. The deck mounting of equipment organic to the landing force to augment Navy provided channels must be approved by CATF, and if approved, the locations and amounts must be approved by each individual ship's captain. The numbers, types, and availability of Navy shipboard equipment for landing force use varies from type to type of ship and from ship to ship within a type. Actual availability of communication equipment on a specific ship for use by the landing force will be stated in the ship's characteristics pamphlet.





## CHAPTER 8

### SPECIAL OPERATIONS

#### Section I. GENERAL

##### 8101. INTRODUCTION

Special operations are those operations in which terrain, weather, nature of the operations, or a combination of these factors creates the need for special techniques, tactics, training, or equipment. Special operations include night, mountain, jungle, and desert operations; combat in built-up areas; river crossings; counter guerrilla warfare; and helicopterborne, cold weather, riverine, air movement, nuclear, chemical, and psychological operations. Special artillery tactics and techniques to be considered in the conduct of these operations are discussed in this chapter.

##### 8102. SPECIAL CONSIDERATIONS

Employment of artillery in support of special operations requires particular emphasis on estimates, plans, and training. For example:

a. Information and intelligence on which estimates are based often come from other than U.S. agencies. In some operations, it is impossible to verify the information because of the distance to or the inaccessibility of the area of operations.

b. Plans developed from estimates based on information discussed in subparagraph a above must be extremely flexible in order that they may be adjusted to unforeseen situations in the combat area.

c. Plans for employment of artillery in special operations include:

(1) Liaison and coordination with appropriate arms and services of the forces (host country) concerned.

- (2) Acquisition and analysis of targets.
  - (3) Coordination of fire support.
  - (4) Amounts and types of artillery and ammunition required during various stages of the operation.
  - (5) Organization for combat.
  - (6) Details of employment of artillery units to include movement into selected position areas, registration, artillery fire support plans, and survey.
  - (7) Special equipment and procedures required.
- d. Training for special operations include training in:
- (1) The use of special equipment.
  - (2) The operation, care, and maintenance of equipment under unusual terrain and weather conditions.
  - (3) Special techniques required to apply basic combat doctrine.
  - (4) Language, government, topography, and customs of the area of employment.



## Section II. NIGHT OPERATIONS

## 8201. GENERAL

The fundamentals of fire support are applicable during periods of reduced visibility. However, operational techniques must be modified to allow for the inherent capabilities and limitations of available fire support elements (artillery, mortars, naval gunfire, and attack aircraft) during periods of darkness. The problems associated with mobility, target acquisition, and fire support coordination are increased during periods of darkness. Proper employment of night operational techniques, night vision aids, and target acquisition equipment will increase the effectiveness of night operations.

## 8202. FIRE SUPPORT COORDINATION

Fire support coordination techniques apply equally during daylight and darkness. The visual control and navigation problems during periods of darkness increase the requirement that unit locations be reported, posted on battle maps and firing charts, and continually verified. Artillery and mortars or naval gunfire may be used as navigational aids. Available night vision, ground surveillance, and illumination means may be used to identify boundaries, checkpoints, limits of advance, and target locations.

## 8203. ARTILLERY (MORTAR) UNIT OPERATIONS

a. General.--Night operational techniques are applicable to all artillery and mortar units. A discussion of movement and reconnaissance, selection, and occupation of position is contained in chapter 5, section V. Unit SOP's must include details for all phases of night operations.

b. Displacement.--Fire support units are prepared to displace under all conditions of visibility to support the ground tactical plan. Unit SOP's must include the techniques of blackout driving and operation of available night vision equipment such as electronic binoculars and metasopes. All units must prepare an SOP for helicopterborne operations during periods of reduced visibility.

## 8204. ADJUSTMENT OF FIRE

a. Adjustment of artillery and mortar fires and naval gunfire during daylight reduces the need for adjustment at night. Adjustment techniques used in dense jungle and rugged terrain are applicable at night. All observers must become proficient in techniques which will aid them during periods of reduced visibility; that is, adjustment by sound, adjustment under illumination, and utilizing WP shells as marking rounds. Available active infrared devices may be used to signal other friendly elements or aerial observers. Each type of night vision aid may be employed to assist in surveillance, navigation, and target acquisition.

b. The aerial observer has the same basic problems at night as the ground observer. Through the use of available searchlights with both visible and infrared illumination, illuminating projectiles, and flares, the aerial observer can more easily detect enemy activities. Using night vision devices, he can often increase his observation capabilities, although

vibrations and reflections from aircraft canopies create difficulties with this equipment. The aerial observer is often invaluable as a radio relay at night. A thorough map reconnaissance prior to takeoff is perhaps the aerial observer's greatest advantage during night observation.

c. The ground and aerial observers, using a common radio net, should work as a team to overcome their respective limitations. After locating friendly elements on the ground, the aerial observer may "creep" fire in until the ground observer is able to spot the rounds and control the adjustment visually or by sound.

d. Construction and use of visibility diagrams (line-of-sight diagrams for radar operators) are useful at night to increase accuracy.

#### 8205. FIRE PLANNING

a. Survey and registration should be completed during daylight hours, if possible. If a flash base can be established, a high-burst or mean-point-of-impact registration may be conducted after dark. All plans must be simple and well coordinated. The possibility of sacrificing surprise should be considered when planning any fires in support of a night operation.

b. Detailed fire planning is required for well-executed night operations. Harassing and interdiction fires upset the operations of the enemy and reduce his mobility. Defensive targets should be adjusted prior to darkness on avenues of approach and gaps in fields of fire and observation.

c. Fires may be scheduled or placed on call during night operations to:

- (1) Isolate the friendly zones of attack and the objective.
- (2) Disrupt likely ambush sites.
- (3) Discourage the enemy's use of snipers and command-detonated mines.
- (4) Protect the rear of a column from followers.
- (5) Protect vulnerable flanks.
- (6) Assist in navigation.
- (7) Harass and interdict.
- (8) Illuminate areas of concern.

d. Preparations are not often used at night, particularly when the supported attacking force is moving by stealth. However, deceptive fires often can be employed to interrupt the concentration of enemy defenders as well as cover any noise made by the attacking force. Preparation and blocking fires should be planned and be available on call. Often pre-planned fires may be used on alternate objectives to deceive and confuse the enemy. When exact enemy locations are unknown, large areas may be reconnoitered by fire by use of zone and shifting techniques by artillery or mortars.

**8206. COUNTERMORTAR/COUNTERBATTERY AND COUNTERROCKET FIRE**

a. A detailed counterfire plan that can be rapidly executed is essential to defeat a night mortar/rocket/artillery attack in which large quantities of ammunition may be delivered in a short time.

b. The counterfire plan should include use of all available fire support means. Targets are plotted on possible mortar/rocket/artillery locations and on avenues of approach. Sectors of the area are assigned to the available fire support units, commensurate with their respective direction of fire and range capabilities. Should a mortar/rocket/artillery attack occur, all or portions of the counterfire program may be fired by target or assigned sector. The direction from which the mortars/rockets/artillery are firing will indicate which portions of the counterfire program should be fired. The actual or suspected locations of enemy mortar/rockets/artillery should be immediately engaged.

c. Available radars, observation posts, and listening posts are coordinated to report incoming rounds, flashes, or sounds of firing. Personnel must be proficient in rendering shell reports. Appropriate communications are established to reduce delays. Often friendly artillery and mortar fires create clutter for radars and confuse observers. A technique to rapidly check which units are firing should be established. An aircraft should be kept on alert so that it may be airborne in time to detect muzzle flashes of enemy mortar and rocket flashes. All counterfire plans must be coordinated and tested to ensure minimum reaction time.

**8207. AERIAL FIRE SUPPORT**

The employment of tactical air and armed helicopters in support of night operations requires detailed planning and coordination because of the difficulties in target identification, location of enemy troops, and control. Artillery and mortars generally are preferable for close support during periods of reduced visibility.

a. All available illumination and night vision devices, tracers fired straight up on each flank of units, and radars should be considered for employment in determining the locations of friendly troops and in identifying targets. Once the pilot or FAC identifies the friendly locations, a target may be designated by an azimuth and distance (polar plot) from an easily identifiable point. Care should be taken not to disclose friendly positions. Searchlights, illumination rounds, and air-dropped flares aid in troop and target identification and control. Detailed planning and coordination is essential to preclude blinding pilots or unnecessarily sacrificing security.

b. The starlight scope, mounted on a rifle or machinegun, may be used by helicopter door gunners or observers to acquire and engage targets. The targets are marked by tracer rounds for further engagement by other armed aircraft.

c. Searchlights and floodlights may be attached to helicopters to facilitate the employment of armed helicopters at night.

**8208. NUCLEAR AND CHEMICAL FIRES**

The employment of nuclear and chemical fires in support of night operations is basically the same as in support of daylight operations.

However, loss of surprise and the adverse effects of nuclear and chemical weapons should be considered in greater detail. Problems peculiar to night operations in a nuclear or chemical environment are obstacles, dazzle, loss of night vision, decreased command and control, diminished effective use of optical equipment while wearing the protective mask, and target acquisition. A detailed discussion of the employment of nuclear weapons is contained in the FMFM 11-4 series; the FMFM 11-3 series contains detailed information on the employment of chemical weapons.



## Section III. MOUNTAIN OPERATIONS

## 8301. GENERAL

The artillery units of the Marine Corps can operate successfully in mountains, although mountain warfare imposes special problems concerning mobility, fires, communications, and tactical employment. Personnel working in high altitudes require rest periods more frequently because of the decreased oxygen in the air. Commanders must consider this additional time factor when planning for mountain operations. This section summarizes the problems which require particular attention in mountain operations. See FM 31-71, Northern Operations, and FM 31-72, Mountain Operations, for additional details on artillery operating in mountains.

## 8302. MOBILITY

The surface movement of artillery in mountainous terrain is generally restricted to roads and improved trails. In mountainous areas, the scarcity of adequate roads and trails limits the choice of avenues of approach to the extent of canalizing the movement of artillery. In addition, the winding roads and steep slopes characteristic of mountainous areas create difficulties in turning towed weapons and in getting them into and out of positions. Towed light weapons can sometimes be manhandled under these conditions. Subject to density altitude limitations, helicopters can be used to transport towed light and medium artillery into areas that have no access roads. Self-propelled weapons, though able to negotiate sharp turns and go up or down steep slopes, are hampered by tracks slipping on icy roads. This can often be overcome by the use of grousers (cleats) on the tracks of vehicles.

## 8303. CONDUCT OF FIRE

a. Artillery fire is not as flexible in mountainous terrain as on the plains, because the choice of positions is restricted and masks are high. However, howitzers are well suited to mountain warfare because of their arcing trajectories. High-angle fire is employed frequently to reach over masks, behind crests, and into deep valleys. Adjustment of fires on targets located on peaks and reverse slopes is difficult. Guns, with their flat trajectories, cannot be used close to the front except in direct fire roles. Normally, guns are employed far enough to the rear to take advantage of an increased angle of fall. Some weapons may be moved forward to provide long-range interdiction fires.

b. Most artillery fires in the mountains must be observed, especially fires close to troops and defensive fires. Observation parties may require augmentation to assist in carrying equipment. Aircraft and helicopters increase the range of observation and permit searching of areas into which ground observers cannot see.

c. Unobserved fires are generally unreliable in the mountains. Meteorological conditions change rapidly, and registration corrections for high-angle fire are valid for only short periods. Effective transfer of fires is difficult, since altitudes within transfer limits vary greatly. A check round should be fired in the vicinity of a target before fire for effect is delivered on the target.

## 8304. AMMUNITION

Impact, high-explosive ammunition is effective in rocky ground, since it scatters stones which become missiles. However, protracted bombardment of defensive positions in the mountains with impact explosives produces few enemy casualties. Fires may be used to initiate rockslides or snowslides to block supply routes or engulf enemy defenses. Variable time and time fuzes are effective, particularly against enemy troops on reverse slopes. Smoke is used but is difficult to control because of winds. Information concerning nuclear weapons effects in mountains is contained in the FMFM 11-4 series. The FMFM 11-3 series contains information concerning chemical weapons effects.

## 8305. TARGETS AND TARGET LOCATIONS

a. Passes and defiles which form bottlenecks in the enemy supply route are ideal targets for artillery interdiction fires. Since the defender is usually dispersed in small groups, massed fires of many weapons are seldom effective and are expensive.

b. Direct observation by ground or aerial observers is the most reliable means of locating targets in the mountains. Ground observers may be restricted in observation by the next hill mass. Deep defilade makes it difficult to locate enemy weapons. Aerial observers should be used to search areas defiladed from ground observation. Much reliance must be placed on shell reports because of the inefficiency of radar and sound ranging equipment in the mountains. Radar surveillance is adversely affected by ground clutter, and sound ranging is difficult because of echoes. Maps and aerial photographs disclose probable weapon locations, since the enemy is also restricted by terrain limitations in his choice of gun positions. Deep shadows and uneven illumination increase the difficulty of interpreting aerial photographs. Countermortar and counter-battery radar, when properly positioned, are particularly effective since much of the fire will be high angle.

## 8306. CONTROL

Terrain compartmentation often requires the use of multiple maneuver columns in the attack. Small forces require artillery support. Decentralization of control of artillery may be necessary to provide support for all columns. Elements of general support type units may be detached in order to provide support for units that are separated by terrain features. However, this procedure tends toward decentralization and loss of control and should not be used unless absolutely necessary to provide artillery support.

## 8307. COMMUNICATIONS

Main wire routes are restricted to roads, and wire lines are vulnerable to breaks caused by enemy artillery or friendly traffic. Cross-country wire is difficult to maintain and is often broken by rockslides and snowslides. The use of aircraft to lay and maintain wire during mountain operations aids in solving this problem. Radio communications are used extensively. Care must be exercised in the selection of sites for antennas of very-high-frequency sets. This does not apply to the FM equipment presently used by artillery. Artillery radio equipment, operating in the

tropospheric scatter mode (FM), requires special attention for effective siting. This must include topographic analysis and pathplanning. The use of relay stations (either ground or air) is prevalent in mountainous terrain. For more detailed information on communications, see FMFM 10-1, Communications.

## Section IV. JUNGLE OPERATIONS

## 8401. GENERAL

Jungle combat is designated a special operation primarily because the inherent difficulties of terrain, climate, and visibility in the jungle complicate the vital problems of command, control, movement, communications, supporting fires, target acquisition, supply, and evacuation. Normal procedures may be modified, and specialized equipment may be required. Training for jungle operations includes thorough indoctrination on living in the jungle, personal hygiene, care of equipment, and the advantages and disadvantages of jungle warfare. Areas requiring special attention by the artillery commander in support of jungle operations are mobility, observation, positions, fires, logistics, ammunition, communications, survey, and security.

## 8402. MOBILITY

a. Conditions encountered in jungle operations impose greater restrictions on the movement of artillery than those encountered in other types of operations. Suitable roads and improved trails are almost nonexistent away from settled areas, and the few that do exist often become muddy quagmires. Roads must be constructed as the movement progresses; and due to the lack of materials suitable for road construction, their use is usually limited to light trucks or light tracked vehicles. Dense vegetation, unstable soils, and poor drainage make road construction difficult. Roads must be continually maintained to ensure continuous movement of vehicles and supplies, since jungle growth quickly reclaims neglected or abandoned roadways. Engineer support is required initially to establish a trail or roadnet of at least minimum standards. Carpenter's tool sets, portable power tools, and chain saws are particularly useful for clearing jungles and for road construction. Special equipment is needed to build roads that will withstand tropical conditions and carry heavy vehicles. Such equipment may include tractors capable of traversing boggy and swampy terrain, bulldozers for roadbuilding and for preparing positions, and in some cases, landing craft and LVT's for crossing rivers and flooded swamps and for displacing along shorelines and rivers. Other considerations are as follows:

(1) Aerial reconnaissance is a necessity in route selection. Aerial photographs effectively supplement maps and map reconnaissance. In addition, helicopterborne scouting parties may be used advantageously in route reconnaissance.

(2) The use of helicopters materially increases the mobility and flexibility of the artillery in jungle operations by providing the batteries with a constant supply of ammunition and the lift capability to move from one firing position to another while bypassing impenetrable areas.

b. The rate of march for ground movement depends on the type of jungle terrain, availability of trails, transportation means, and formations and security elements employed. If a dismounted march is required, march distance, obstacles, and the physical condition of the troops are considered in calculating the rate of march. The rate of march, the distance of march, and the number of rest periods are commensurate with the physical endurance of the men. Extreme temperatures make frequent halts



necessary. During mounted marches, the rate of march, march distance, type of security formation, and fire support available are the major factors considered.

c. Standard march security measures are applicable to jungle movement. However, distances between march elements are reduced and other security measures are intensified because of the reduced visibility and the natural obstacles. When a unit is operating independently, all-round security is necessary.

(1) Point security elements may proceed ahead of the advancing main column to reconnoiter all possible danger areas. Elements should include combat engineer teams.

(2) Flank security is a continuing requirement. During a mounted march, the only flank security available may be that provided by individuals with assigned weapons in the vehicles, aerial fire support, or fire support available to an airborne air observer assigned to assist the march element. When foot marches are required, flank security elements may have to cut their own trails and will experience difficulty in keeping abreast of the march column. In these cases, the security elements are rotated frequently, thus reducing the speed of the column. When the column is crossing danger areas, flank security elements may be employed to cover the crossing. If used, these elements rejoin their march units as soon as possible after the crossing is completed.

(3) Supporting weapons should be located in the column in such a manner as to be capable of supporting against any attack consistent with enemy tactics.

(4) During extended halts and, when possible, during short halts, units move off the roadway or trails and form a hasty perimeter. Precautionary measures should be taken against enemy mines. Security elements are posted in all directions. At least 50 percent of the unit is placed on alert. Units halt for overnight bivouac area before dark.

(5) Preplanned on-call fires for execution by other artillery or other fire support means may be developed and executed for specific target areas along the route of march. These are used in the event the column is attacked while marching.

d. Vehicle maintenance requirements increase because of the effects of humidity, precipitation, and high temperatures. These conditions cause an excessive number of spring failures, overheated engines, electrical and fuel system failures, and the rotting of canvas and corrosion of metal items. These adverse conditions also affect other items of equipment.

#### 8403. OBSERVATION

a. Observation is restricted by jungle growth and is often limited to the immediate vicinity of the observer. Usually, the canopy in a primary rain forest, which consists of a virgin growth of mature trees, is so thick that it cuts off most sunlight and reduces visibility to 20 to 30 yards. Visibility may be limited to 5 yards or less in a secondary forest, which is composed of a growth that develops when the original forest has been burned off or cut. Rain, clouds, and the steamy exudation from wet areas also tend to reduce visibility. Because of limited visibility and

lack of conspicuous landmarks, it is often difficult to locate a ground position from a map. By communicating and coordinating with available observation aircraft, forward observers may have to establish their exact location by several means such as compass, pacing, and resection.

b. Artillery forward observer teams must be large enough to carry the equipment, provide security, and if practicable, lay wire. They must be well forward but in close contact with the supported unit at all times. Since checkpoints and known locations are rare, observers must use initiative in devising methods of spotting fire. If the observer cannot see the burst, he may use the sound-spotting method. The observer must know the angle of fall of the projectile and the height of the trees in the vicinity of the target to prevent projectiles from bursting over friendly troops. Often, close-in targets can be engaged only through the use of high-angle fire. Some observation advantage may be gained from high trees and dominating terrain. Also, aerial observation is effective in locating hard targets such as enemy batteries, troop concentrations, bivouacs, and boats. Often, it may be necessary to adjust fires using "creeping" techniques to ensure the safety of supported troops.

c. Aerial observers can be profitably utilized in jungle warfare in adjusting fires, locating friendly lines and enemy bivouac sites, and spotting targets for airstrikes. Aerial observers can work as a team with ground observers in adjusting artillery fires. Although the ground observer can hear the rounds detonate, he often cannot see the bursts, even though he can see the target; the aerial observer can see the bursts but may know only the approximate location of the target. A combination of their spottings (both visual and by sound) gives the fire direction center a better picture of the adjustment and speeds up the delivery of effective fire.

d. Patrols are often an excellent source of target information.

e. Smoke and white phosphorus ammunition are often used to mark targets for airstrikes and to assist in observation during adjustments.

f. The employment of surface target acquisition devices is generally restricted by tree canopy, lack of survey control, poor trails for moving heavy equipment, and the necessity for cleared fields of scan for the radar sets. When they can be installed, sound and flash ranging bases and radars can operate efficiently, though their range may be reduced.

#### 8404. POSITIONS

Jungle vegetation makes the preparation of positions difficult because the required fields of fire for weapons must be hacked out of the jungle. When possible, the positions should permit a 6,400-mil firing capability. In some cases, positions along streams, on beaches, or on adjacent islands may provide suitable fields of fire. Since natural fields of fire are generally limited to 5 or 10 meters and undergrowth is generally heavy, several days of labor may be required to clear 100-meter fire lanes around positions. This work is expedited by employing defoliants. Care must be taken, in clearing fields of fire, to disturb the tree pattern as little as possible to avoid disclosing the positions to enemy aircraft. When possible, artillery batteries occupy positions near roads or trails. In wet weather, roads into positions should be corduroyed and a firing platform built to support each weapon. In some positions, it may be

necessary to emplace weapons on prefabricated weapons firing platforms which can be transported to the site by helicopter.

a. Artillery units stress position security. Positions are normally more compact in jungle terrain than in open terrain. Positions are constructed to provide a 6,400-mil, all-round firing capability, with the weapons placed close together to facilitate control and security. The area is bounded by barbed wire set out beyond hand grenade range and supplemented with boobytraps, trip flares, and sharpened stakes. Lanes of fire for machineguns are cut in the form of tunnels through the jungle, and are made to interlock with those of adjacent machineguns. Combat outposts, listening posts, and patrols are usually required. If available, night vision equipment, illumination devices, and sensors should be used in the perimeter defense.

b. Within the position, paths or trenches should be cut to connect each howitzer section with other battery installations and with foxholes and/or fighting bunkers with firing ports which can be occupied to support the perimeter defense. Wire entanglements are placed around each howitzer section to prevent close-in grenade and bayonet charges and to preclude an enemy force from moving simultaneously and directly to all weapons. All personnel should have foxholes (preferably with overhead cover) readily accessible. At least two men must be alert at each howitzer at all times. A warning system is a matter of SOP.

c. When the mission permits, the artillery with a direct support mission should be located within the area of the infantry reserve unit to take advantage of the protection provided by the riflemen. The batteries of a battalion should be within range of each other to ensure mutual protection and to retain the ability to mass fires on a common target. After each battery has established a perimeter defense, the defense system must be integrated into a battalion defense plan. Security must be stressed when displacing to new positions, since the jungle aids the enemy in preparing an ambush.

#### 8405. FIRE CAPABILITIES AND LIMITATIONS

a. As in mountain operations, the delivery of accurate massed fires in jungle operations is difficult, and the flexibility of artillery fire is reduced by high masks, scarcity of suitable position areas, lack of accurate maps and survey control, and restricted observation. Direct fire missions may be required to defend positions against ground attack. Heavy and medium artillery may be used in a direct fire role to destroy caves and pillbox emplacements. Light artillery may be used in the direct fire role to defoliate trees and destroy natural camouflage to expose hidden emplacements. High-angle fire may often be used to clear tall masks surrounding positions. Caution is exercised when adjusting all fires to ensure that friendly troops are not injured by tree bursts.

b. Fire support and maneuver are interdependent; their planning and execution are more difficult in the jungle and must be closely coordinated. The procedures to accomplish the tasks involved in the coordination of fire support will vary with the headquarters, the volume and type of fire support available, and the type of operation.

(1) Long-range fires, close-in defensive fires, and fires within the position are planned and executed as in normal terrain.



(2) The proximity of units in jungle operations calls for extensive and detailed planning of final protective fires and defensive targets.

(3) The control of fires of the infantry's organic weapons is decentralized to the extent required by the frontage of the unit, the terrain, and the limits of the higher commander's observation.

(4) Units whose defense areas are not under attack or whose fires are not required to support the area under attack may hold their fires so that their positions will not be revealed.

(5) The effects of jungle terrain on the efficiency of supporting weapons are always considered when planning for fire support.

c. The observer often adjusts fire on close-in targets by spotting the location of the burst through sound and then using the creeping method. When this method of adjustment is used, extra caution must be taken by both the observer and the fire direction personnel to guarantee accuracy. Observers with adjacent units can assist in the adjustment by giving their sound spottings.

d. Problems in control and communications often make decentralized control of artillery unavoidable. As a result, batteries may be employed independently. In such situations, a more thorough reconnaissance is necessary in locating future positions, and closer liaison is required with the supported unit. Jungle fighting erupts suddenly, and quick reaction of the artillery is essential. During marches, a single piece near the head of the column may place direct fire on enemy roadblocks, tanks, or bunkers. Light artillery is generally more appropriate for jungle warfare than medium and heavy artillery because of the ease in handling and transporting. However, towed medium artillery, which is transportable by helicopter, and heavy artillery are invaluable because of their long-range capability, heavy volume of fires, and greater penetration capability.

e. Under tropical weather conditions, meteorological data is generally not subject to rapid change; therefore, meteorological corrections are reasonably accurate.

#### 8406. AMMUNITION

a. Supply and storage of ammunition is a serious problem in the jungle. Since many missions are fired close to friendly troops, sorting of ammunition must be carefully supervised to ensure uniform lots. Ammunition must be stored with care to protect it from moisture, since exposed powder charges and metal surfaces deteriorate rapidly in the jungle humidity.

b. High-explosive (HE) shells are effective in the jungle. The choice of fuzes for HE shells is influenced by the nature of the vegetation. Antipersonnel ammunition (beehive) may be employed in a direct fire role in defense of the battery area. Smoke shells are used extensively in adjustment, because their bursts can be easily identified and are useful in marking targets for airstrikes and for producing smokescreens. Chemical shells are effective in producing casualties among personnel in prepared positions and emplacements that are relatively invulnerable to other shells. A longer target exposure time to the effect of chemical agents results from low wind speeds and stable meteorological conditions under jungle canopy.



Information concerning nuclear weapons effects in forests is contained in the FMFM 11-4 series; the FMFM 11-3 series contains information concerning chemical weapons effects.

c. Fuze quick is effective in areas of low tree canopy; it provides tree bursts at a desirable height and produces a bonus effect of splintering. VT and time fuzes are generally ineffective in areas of heavy tree canopy; the rounds are difficult to adjust, and much of the fragmentation effect is dissipated in the canopy. The performance of VT fuzes may be erratic because of excessive moisture.

#### 8407. COMMUNICATIONS

a. Although radio communications in the jungle are highly desirable, especially in the attack, it is seriously affected by line-of-sight restrictions, dense vegetation, and adverse atmospheric conditions, resulting in a 40- to 70-percent decrease in the range considered normal in open or lightly wooded terrain. Radio operators are trained to copy weak signals and to use expedients in constructing and siting antennas. Remote control equipment may help in securing more favorable locations for radio sets. Aircraft can assist ground communications by acting as radio relay stations and making terrain surveys for radio relay sites. Helicopters can be used to transport personnel and equipment to selected sites, thus expediting the installation of important circuits. Aircraft may also be used to supply communication personnel operating radio relay stations with rations, POL, and parts.

b. The limitations imposed by the jungle on other means of communication place greater emphasis on wire. Ground wire routes are limited, and the few available routes are normally heavily traveled, making overhead construction desirable. Helicopters may be used to lay wire rapidly over jungle canopies. In a fast-moving situation, maintaining wire communications may be difficult, and the vulnerability of wire lines to enemy sabotage and/or tapping for intelligence purposes increases.

c. Visual communications include the transmission of messages by flags, panels, and pyrotechnics. The use of visual communications is limited by the density of the jungle and the scarcity of areas suitable for their use.

d. Before the commencement of jungle operations, every possible measure is taken to dry out and protect equipment. The care of communication equipment is of special importance in the rainy season. It must be protected against fungus growth, insects, corrosion, and moisture.

#### 8408. SURVEY

a. Since adequate maps do not exist for most jungle areas, survey control should be established when feasible. Survey through jungle growth is a time-consuming and difficult operation. Though few survey control points may be available, survey control can usually be extended to individual forward observer teams and battery positions. Target area survey is usually restricted or impossible. Since line-of-sight (required for triangulation, resection, and trilateration techniques) is usually extremely short or nonexistent, traverse is generally the survey technique used for all but the target area survey.

b. When the tactical situation precludes the use of standard survey techniques (traverse, triangulation, astronomic observation, or gyro azimuth surveying instrument techniques), survey control may be extended by using one or a combination of the following: radars, helicopters, and aerial photographs and photomaps. Frequently, it is necessary to establish initial control by map-spotting and directional control by astronomic observation or by use of a gyro azimuth surveying instrument. However, the use of countermortar radars to determine horizontal control and simultaneous observation to extend directional control is usually more accurate than map-spotting.

#### 8409. LOGISTICS

a. Logistic problems of the artillery in jungle operations develop from the rapid deterioration of all classes of supplies, the difficulty in moving supplies, in keeping supply and distribution points close to elements on the move, and the increased need for preventive medicine. Supply economy on the part of each individual is rigidly enforced. Security of logistic installations is a continuing requirement, since jungle conditions are conducive to infiltration, guerrilla action, and raids.

b. Logistic requirements must be anticipated well in advance of actual needs, and provisions must be made for adequate storage of supplies and for issuing supplies to the user. Control of all classes of supplies must be closely supervised in order to exclude surplus and nonessential items. For maximum efficiency, all modes of transport should be used. Air lifting and aerial delivery are important means of supplying jungle operations. Emergency supplies can be airlifted when all other means of transport fail.

c. Although all equipment for use in the tropics must be capable of functioning efficiently in high temperatures, temperatures alone do not cause the greatest difficulties. Storage and supply problems of all items are compounded by the combined effects of jungle conditions.

## Section V. DESERT OPERATIONS

## 8501. GENERAL

Artillery techniques may be modified for operations in desert regions. Desert terrain varies from low, flat, sandy plains to high, rocky mountainous areas. Temperatures vary from torrid to subzero according to the latitude and altitude. Characteristics that are common to all desert regions are arid climate and a lack of vegetation. The principal problems confronting artillery engaged in desert warfare are associated with observation and maintenance.

## 8502. MOBILITY

Deserts are relatively free of natural obstacles to movement. Existing obstacles can normally be bypassed; however, areas of loose sand may affect and hinder movement of wheeled vehicles. Care must be taken to move over concealed routes or by infiltration methods during daylight hours. Self-propelled artillery can be shifted from one area to another in the same or less time than required for towed artillery. Adequate guides and markers must be provided to prevent elements being lost. Due to reduced authorized vehicle loads in desert operations, augmentation of artillery vehicles may be desirable to assure adequate numbers of vehicles for ammunition, personnel, and equipment as well as prime movers for towed weapons. Additional water is carried in all vehicles during movements. Night displacement is most desirable in desert areas; however, blackout is especially important.

## 8503. OBSERVATION

a. Ground observation of artillery fires in hot, flat, sandy desert areas is difficult because of heat waves, mirages, lack of elevated positions, and frequent duststorms. Distances observed over flat terrain are deceiving and are usually underestimated. The absence of identifiable landmarks reduces the value of maps. Aerial observation, although more effective than ground observation, is also hampered by these factors.

b. Observation in mountainous desert areas is subject to the limitations discussed in paragraphs 8301 through 8307.

c. Because of the absence of natural camouflage materials, additional consideration must be given to camouflage in desert areas.

## 8504. MAINTENANCE

Because of the frequent duststorms and windstorms, continuous intensive maintenance is required to protect all material from the abrasive action of the fine dust and sand. Wear on cannon tubes, slides, and all bearing surfaces, as well as scoring and pitting of optical instruments, are greatly increased in desert regions. All vehicles require extensive maintenance of engines, suspension systems, and glass surfaces. Tires have unusually short mileage as a result of heat and abrasive action. Consideration should be given to augmentation of maintenance personnel, particularly on the battery level.

## 8505. COMMUNICATIONS

Radio is usually the primary means of communication. The inherent problems in desert operations may be attributed to three primary factors. The desert provides poor electrical grounds, and as a result, the efficiency of standard antennae may be decreased by some 30 to 50 percent. For this reason, it is important to provide artificial grounds such as counterpoises whenever feasible. The second factor is the large amounts of sand, dust, or dirt that may enter the equipment. Also, magnetic disturbances, dead space, and the effects of reflection are prevalent. Siting of radios must be constantly examined.



## Section VI. COMBAT IN BUILT-UP AREAS

## 8601. GENERAL

a. Most built-up areas can be bypassed without materially affecting the commander's plan of maneuver. Only built-up areas that occupy key terrain or that constitute islands of resistance so large as to be serious threats to future operations normally are attacked. Outlying areas which afford good fields of fire become the enemy's first line of defense. This line may be fortified with anything from hastily prepared positions to mutually supporting concrete emplacements. If the initial line of defense is penetrated, the defender must fall back to the town. The attack of a built-up area is divided into the following three phases:

- (1) Isolating the built-up area.
- (2) Penetrating the defender's initial line of defense.
- (3) Advancing through the built-up area.

b. FM 31-50, Combat in Fortified and Built-Up Areas, contains a detailed discussion of the phases of combat in fortified and built-up areas.

## 8602. ARTILLERY SUPPORT OF THE ATTACK

a. After the built-up area is isolated, the artillery commander prepares to support the two remaining phases of the attack. In the second phase, which is to penetrate the defender's initial line of defense, control of the artillery is centralized. The mission of the artillery in the second phase is to destroy fortifications, neutralize enemy artillery, and provide interdiction fires. The forces holding the built-up area will normally have good observation, thus forcing friendly troops to displace at night or along concealed routes. With the successful completion of the second phase, the artillery displaces quickly to support the third phase of the attack.

b. The third phase of the attack, which is to advance through the built-up area, is characterized by semi-independent action of small units, which attack through separate corridors of the built-up area. Control of artillery in the third phase is frequently decentralized to provide support to the attacking units. Observation is usually poor, and artillery must depend almost entirely on forward observers for conduct of fire. Communication with forward observers is impaired by buildings that interfere with the line-of-sight characteristics of field artillery FM radios. Direct fires should be delivered by self-propelled weapons which have sufficient firepower to destroy designated buildings. Artillery providing close support to attacking troops must be capable of high-angle fire. If opposing forces are close together, it may be necessary to withdraw the attacking forces while artillery is being fired.

c. A built-up area that has been attacked with nuclear weapons may become a formidable obstacle and may provide an excellent defensive area; consideration should be given to the use of chemical weapons if destruction of buildings is not desired. The plan for employment of nuclear weapons

against a town should provide for a relatively clear passage through some portion of the town; this portion should be attacked with chemical fires that produce negligible contamination. The enemy must be prevented from reoccupying the town after it has been attacked with nuclear weapons; chemical fires that produce significant contamination may be considered for use in this role. Further information concerning nuclear weapons effects against built-up areas is contained in the FMFM 11-4 series of manuals; the FMFM 11-3 series contains information concerning chemical weapon effects.

#### 8603. ARTILLERY SUPPORT OF THE DEFENSE

In the defense of a built-up area, artillery is emplaced so that it can fire against hostile forces attempting to envelop or bypass the town. The supporting artillery must be able to deliver the preponderance of its firepower on the critical avenues of approach, and to fire final protective fires on close-in approaches such as streets, open areas, and areas containing lightly constructed buildings. If the enemy makes a penetration, the artillery must be able to deliver the preponderance of its firepower against the penetration and to support the counterattack.

## Section VII. RIVER CROSSINGS

## 8701. GENERAL

Wide, unfordable rivers have considerable influence on military ground operations because they impose restrictions on surface movement and maneuver. They constitute obstacles to attack and afford natural lines of resistance for defense. The maximum use of artillery should be considered. For details of river-crossing operations, see FM 31-60, River Crossing Operations.

## 8702. ARTILLERY SUPPORT OF THE CROSSING

a. A surface crossing is supported from positions as far forward as secrecy permits. These positions are occupied under cover of darkness or during periods of low visibility at the latest possible time prior to the attack. When the defender has the capability to employ nuclear weapons, the attacker must avoid forming large vulnerable targets on either side of the river. Movements from rear assembly areas are continuous through the crossing sites.

b. Artillery units in general support and reinforcing must be prepared to provide close support for the assaulting troops during the displacement of artillery units in direct support to the far bank.

c. The major part of the artillery crosses the river when it is determined that continuous effective support can be provided from the new positions.

d. Fire support planning must be detailed and coordinated at all echelons. The purpose of a river crossing is to move the attacking force across as rapidly and as efficiently as possible, so that it may either continue the attack to destroy the enemy or secure objectives which will protect the crossing of the remainder of the force. Artillery with the crossing force is organized to support this essentially offensive operation and in accordance with the fundamentals for organizing artillery for combat. Maximum feasible centralized control of artillery is maintained consistent with the type of crossing made (deliberate or hasty) and with the intended employment of the assault forces when the crossing has been accomplished. When necessary, nuclear weapons or smoke may be used to ensure a successful crossing. Properly employed, nuclear weapons or smoke may eliminate effective small-arms fire on the crossing sites; they may also eliminate effective fire on the crossing sites by destroying or neutralizing enemy artillery or enemy observation capabilities. Chemical fires that produce negligible contamination may be used at the crossing sites. Chemical fires that produce significant contamination may be used to isolate the defending forces or restrict their movement. Consideration should be given to maintaining a reserve of nuclear weapons for employment against the mobile counterattacking forces of the defender after the assault crossing. The use of helicopterborne units to lend flexibility and speed to crossing operations requires close and detailed coordination of supporting fires.

e. When nuclear weapons are employed, initial objectives are normally deeper than when only nonnuclear weapons are employed. Initial objectives, which may include objectives for helicopterborne assault, are



selected to isolate the defending forces, destroy them in place with nuclear weapons and offensive maneuver, or force them out of position. Rapid exploitation follows the assault across the river obstacle.

f. Prior to, during, or immediately after the crossing, artillery may be required to:

- (1) Furnish illumination.
- (2) Provide smoke to interfere with or prevent enemy observation.
- (3) Screen movement and crossing noises of the attacking force by fire.
- (4) Support feints and demonstrations.

#### 8703. ARTILLERY SUPPORT OF A DEFENSE AT A RIVER LINE

a. The organization for defense depends on the terrain, enemy situation, forces available, and nuclear and air situations. Artillery is employed to cover all probable crossing sites. It is deployed in depth so that it can mass fires on critical points in the enemy's rear. Elements of the artillery may be positioned on the far shore in support of security forces. Coordination between the artillery and the security forces is essential to ensure the withdrawal of the artillery with the security forces. Emphasis is placed on fires which assist in canalizing the enemy and which stall his attack astride the river and destroy him by fire and counterattack. When the enemy's main crossing is disclosed, artillery must be prepared to support the counterattack with the bulk of its fires. Emphasis is placed on maintenance and probable routes of displacement and on preparation of fire plans and supplementary positions to support all counterattack plans.

b. When the number of suitable crossing sites available to the enemy is limited, the planning for nuclear and chemical fire support includes provisions for the disruption of the approaches to the crossing sites on either or both sides of the river, depending on the defense maneuver plan. A target analysis is made of the area within the defensive position for the possible elimination of enemy bridgeheads by use of nuclear and chemical fires. Nuclear and chemical fires against the enemy on the friendly side of the river are exploited by mobile reserves. Nuclear and chemical fires on the enemy side of the river are exploited with other fire support resources.

c. If the enemy has an airlift capability with which to overcome the river obstacle, defenses must be established commensurately.



## Section VIII. COUNTERGUERRILLA OPERATIONS

## 8801. GENERAL

a. Gaining the support of the population is of paramount importance in the formulation of national strategy in a counter guerrilla operation environment. The military role must be viewed as part of the larger problem of internal development; therefore, military actions must not only provide tactical benefits, but must also support long-range internal development objectives. This requires, for example, selective use of artillery firepower to ensure that the support of the population is not lost as a result of the tactical operations.

b. Artillery is capable of supporting all aspects of internal defense and internal development activities. In counter guerrilla operations, tactical operations are conducted to destroy insurgent forces and bases and establish a secure environment within which internal development is possible. Tactical operations are coordinated with civilian agencies through the area coordination center (ACC). The pressure of artillery elements in some areas may discourage movement in open and restricted areas covered by detailed force planning. The degree of participation by artillery is dependent on several factors, including United States policy, the host government policy, and the level of insurgent activity (see par. 8803).

c. The mobility, disposition, and tactics of insurgent forces are such that targets are difficult to locate and engage. Ammunition expenditures may be greater with fewer confirmed or measurable results when compared with those in conventional warfare. Prearranged fires designed to impede enemy movement across defensive lines or areas and night illumination missions for outpost and village defense have proved invaluable. The demoralizing effect of artillery fire on insurgents often justifies its use even though there is little possibility of obtaining measurable results. Artillery, with its quick-reaction times and capability of shifting fires over wide areas, is a responsive and effective means of countering insurgent actions. The delivery of timely and effective artillery fire in response to insurgent activity often discourages further activity within known weapon ranges.

## 8802. COORDINATION MEASURES

The terms defined below are applicable to counter guerrilla operations and are used in coordinating surface fires.

a. Tactical Area of Responsibility (TAOR).--A TAOR is a specific area on the ground for which responsibility is assigned to a single commander. All fire and maneuver conducted within a TAOR must be coordinated with the commander to whom it is assigned. TAOR boundaries normally follow established political boundaries to facilitate coordination.

b. Fire Coordination Area

(1) A fire coordination area is an area in which specific restraints have been imposed and into which fires in excess of those restraints will not be delivered without approval of the establishing authority. A fire coordination area is established by the maneuver commander to control close

defensive fires within an area in which his troops are located. The restrictions on firing into fire coordination areas may vary with locality and time. For example, a supported commander's restrictions may be:

(a) The target must be positively identified as hostile.

(b) The target (area) must be observed from the air or the ground, or both.

(c) If the criteria in subparagraphs (a) and (b) above have not been met, permission to fire must be obtained from the authority that established the area.

(2) The fire coordination area is depicted on a fire support map or an overlay by outlining the area with a red line. The words "fire coordination area," the designation of the unit establishing the area, and the effective date-time group for commencement and termination are written inside the area. No fire delivery means may fire into this area without permission of the establishing authority unless it can meet the criteria in subparagraphs (a) and (b) above. The area should be readily identifiable from the air, but the location can be given as a radius from a point. Preferably, identification of the area is disseminated to all levels in overlay form; however, it may be disseminated by radio or wire.

c. Area Coordination Center.--An area coordination center is established as a combined civil and military headquarters at regional, provincial, district, and local levels. The center is responsible to the area commander--military or civilian--for planning, coordinating, and directing operations within its respective areas of jurisdiction. United States and host country policy and agreements will determine command relationships between combined forces in the center. The center does not replace the COC and FSCC at division level above and below, or the normal governmental administrative organizations in the area of operations. Its mission is to provide integrated planning, coordination, and direction of all counterinsurgent operations efforts to ensure immediate, coordinated response to operational requirements.

d. Area of Operations.--The area of operations is that portion of an area of conflict necessary for military operations, either offensive or defensive pursuant to an assigned mission, and for the administration incident to such military operations.

#### 8803. PHASES OF INSURGENT ACTIVITY

The degree of participation by Marine Corps artillery units in counterinsurgent operations is related to the level of insurgent activity. The following phases of insurgent activity describe the levels of intensity of insurgency:

a. Phase I.--Phase I ranges from circumstances in which subversive activity is a potential threat--latent or incipient--to situations in which subversive incidents and activities occur with frequency in an organized pattern. It involves no major outbreak of violence or uncontrolled insurgent activity (see JCS Pub 1, Department of Defense Dictionary of Military and Associated Terms). Subversion is the major activity, and generally, there are no insurgent tactical forces coordinating field operations.

b. Phase II.--Phase II is reached when the subversive movement, having gained sufficient local or external support, initiates organized guerrilla warfare or related forms of violence against the established authority (see JCS Pub 1). Important factors of this phase are that, in guerrilla warfare, combat operations are conducted in government-controlled territory by relatively small groups using tactics characterized by elusiveness, surprise, and brief violent action for the purpose of absorbing and diverting government resources and creating an atmosphere of confusion and uncertainty. Insurgent tactical forces begin guerrilla warfare operations while subversion continues. The insurgent objectives in this phase are to extend political control, initiate organized guerrilla warfare or related forms of violence, and prepare for war of movement.

c. Phase III.--The situation moves from phase II to phase III when the insurgency becomes primarily a war of movement (mobile warfare) between organized forces of the insurgents and those of the established authority (see JCS Pub 1). Organized insurgent forces are forces which are capable of developing combat power similar in magnitude to that of opposing armed forces elements. The war of movement is initiated while both guerrilla warfare and subversion continue.

#### 8804. TYPES OF WARFARE ENGAGED IN BY INSURGENTS

The type of warfare engaged in by insurgents is classified according to tactics employed.

a. Guerrilla Warfare.--Guerrilla warfare is conducted predominantly by the militant arm of the insurgent in the advanced phases of insurgency. Forces conducting guerrilla operations may vary in size from squad to company, or larger. They may be organized as regular, paramilitary, or irregular armed forces. The distinction between these forces is based on differences in organization, training, weapons, equipment, and mission. The operations conducted by these forces are characterized by surprise, elusiveness, and brief, violent actions. This type of warfare may be supported in varying degrees by external support.

b. War of Movement.--War of movement is conducted predominantly by sophisticated paramilitary or armed forces in phase III insurgency. War of movement comprises movement in which the opposing sides seek to seize and hold the initiative by use of maneuver, organization of fire, and terrain. Units are prepared to defend objectives deliberately for longer periods than in guerrilla warfare. They attack, in battalion or larger size forces, military units of similar size; however, there are no frontlines or rear areas, and the battlefield is not organized as in limited and general positional warfare. Positional warfare comprises those operations in which the opposing forces seek to seize and hold terrain permanently by use of maneuver and organization of fire and by retention of the initiative. Positional warfare normally is associated with limited and general war but may be conducted in the latter stages of an insurgency. In any case, be it a war of movement or positional warfare, the guerrilla threat may exist. If so, appropriate defensive measures must be planned by all units.

#### 8805. EMPLOYMENT OF ARTILLERY

Counter guerrilla operations consist of activities in support of indigenous or allied forces engaged in establishing, regaining, or maintaining control of land areas threatened by guerrilla action, revolution, subversion,



or other tactics aimed at internal seizure of power. Artillery tactical missions in counter guerrilla operations are the same as in unlimited or general war. Additional missions that may be assigned artillery units in counter guerrilla operations include internal security operations (see par. 8807), intelligence operations (see par. 8808), psychological operations (see par. 8810), and advisory assistance (see par. 8811).

a. Considerations.--In counter guerrilla operations, greater emphasis is placed on the employment of batteries and sections on independent missions with centralized control. Employment of battalion-size units will seldom be practical or possible because of the wide dispersion of internal defense assistance forces, difficult terrain, limited observation, and lack of or limited mobility. Some of the considerations are listed below.

(1) Main Considerations

(a) Particular consideration must be given to general limitations on the use of artillery and other fires in populated areas. Fire planning and coordination must ensure that fires are highly selective and restrained in application in the vicinity of a population whose support of the government is of paramount importance, and whose physical well-being and property must be protected. The artillery commander must establish liaison with the area coordination center in order to maintain close coordination with the representatives of air, naval, and host country fire support elements.

(b) Additional fire support may be needed because of the wide dispersal of batteries or sections and because poor terrain conditions may make observation of artillery fire difficult.

(c) The positioning of artillery is influenced by the requirement for defense against guerrilla attack and by the necessity to maximize the 6,400-mil firing capacity.

(d) Additional security forces are normally required to maintain adequate and continuous security for the position.

(e) Artillery is capable of delivering fire in all conditions of weather and terrain, both day and night. Fires can be massed and shifted rapidly and accurately over a large area without warning. This provides the artillery the ability to conduct demonstrations for show of force, which provide a great psychological effect on the insurgents.

(f) Maintenance, supply, and other logistic activities may be difficult to maintain. Methods must be devised and instituted to provide logistic support when artillery units are deployed or when the insurgents control surface transportation routes.

(2) Special Considerations

(a) Techniques for requesting and adjusting artillery fire should be locally adapted and sufficiently flexible to allow indigenous personnel to request and adjust fire.

(b) Timely and accurate artillery fires delivered on an insurgent force in counter guerrilla operations may have a dual impact--one that is damaging to the insurgent force and one that is reassuring to the friendly force.



(c) Batteries, platoons, or sections may operate at remote distances from each other for short periods of time. In such instances, the battery, platoon, or section must be augmented with the appropriate elements of survey, security, fire direction, and transport.

(d) Artillery may be employed to provide fire support in border denial operations. Artillery is especially effective when accurate fire is needed to deny entry into or exit from the area of operations.

(e) Survey and reconnaissance parties must take extensive security precautions. Route and position reconnaissance will often be limited to aerial reconnaissance, maps, and/or survey data. Survey data, in the form of trig lists and bench marks, may be nonexistent or unusable. Use of the observed firing chart and, when time is available, the executive officer's high burst may be required.

(f) Artillery units may be used to provide protection for convoys.

(g) Often weapons must be moved by air, water, packmule, and overland. Light and medium towed units may be moved by helicopter to firing positions to support friendly operations. These units should prepare SOP's and loading lists and should be trained in the tactics and techniques of helicopterborne operations.

(h) Artillery may be employed to provide reconnaissance by fire. This is accomplished by firing on suspected targets or target areas in order to produce a reaction from the insurgent force.

(i) The vast areas normally associated with counter guerrilla operations and the resulting extended distances between units or elements will complicate command, control, liaison, supervision of operations, training, administration, and maintenance. Maximum opportunity to exercise command, with its inherent responsibilities and pride of leadership, should be given to the small unit commander.

b. Security.--In addition to the security consideration listed in subparagraph a(1)(c) above, artillery in position or in convoy, ammunition trains, supply, and command and control activities are at all times vulnerable to insurgent attack or ambush. The mission of the artillery unit is always the primary planning consideration; however, commanders should recognize the omnipresent threat of the insurgent forces. The threat imposes a need for constant vigilance and normally will necessitate a request for additional security forces from the force commander. It is axiomatic that the more fragmented an artillery unit and its activities become, the more susceptible and vulnerable they become to insurgent action. Imagination and ingenuity, for instance, in the use of VMO aircraft in a column cover role and coordination with friendly units along the route of march should be exploited.

c. Massing Fires.--The most effective way to mass sufficient combat power rapidly when an elusive enemy is engaged in difficult terrain is through the use of fire. When the insurgent force has been located, the use of massive fire support is necessary to defeat the insurgent and destroy his position. Fleeting targets can be attacked by extensive fire planning of preplanned on-call fires to neutralize, block, and canalize the target. Fire support should include artillery, fixed-wing support, armed helicopters, and naval gunfire.

## 8806. TACTICAL OPERATIONS

a. One of the primary differences between artillery employment in limited and general war and in counterguerrilla operations is the requirement in counterguerrilla operations to limit casualties among the civilian populace, and limit damage to the materiel resources of the country. Consideration may be given to integration of riot control munitions into the unit's planning for fire support. Indiscriminate application of artillery fires in populated areas may turn the populace away from the government and toward the insurgent movement. The support of the populace is the key to success.

b. Artillery in position or being displaced, associated combat service support installations, survey and forward observer teams, and command and control facilities constantly are subject to insurgent attack. Artillerymen must be prepared at all times to defend their positions, and as many activities as possible should be collocated for security.

## 8807. INTERNAL SECURITY OPERATIONS

a. In addition to supporting unit tactical operations, artillery must be prepared to assume territorial fire support responsibilities. This role is particularly pertinent in consolidated areas and areas undergoing consolidation. In such areas, the police will have assumed responsibility for the internal security of the hamlets and of certain consolidated areas between the hamlets. Small insurgent parties still may be operating in the area. Artillery personnel may assist the civilian police in enforcing a population control measure such as a curfew.

b. The territorial security requirement may require that, for long periods of time, artillery be fragmented and employed down to section level. The requirement to cover an entire political area with fire from dispersed artillery pieces must be balanced with the requirement to mass fires against insurgent formations. Artillery employed in territorial security must cooperate and be able to communicate with host country police and local political functionaries in order to provide effective fire support to hamlets and along lines of communication.

c. Civilian police and paramilitary forces, together with artillery unit personnel, may be integral portions of a single, coordinated defense position in which the artillery unit is located. Artillerymen and units must be able to participate in internal security operations in and around firing positions.

## 8808. INTELLIGENCE OPERATIONS

a. Artillery units in internal defense and development situations are more involved in producing intelligence than they are in limited and general war. This is particularly true of territorial security artillery, which characteristically is scattered among many population centers within the supported political subdivision.

b. Artillery units employed in territorial security are in proximity to both the civilian populace and the insurgent forces. No frontlines separate the artillery from direct contact with the enemy, as in limited and general war; therefore, battery personnel are key information collection agents. Close contact with civilian police in conducting combined internal

security operations enhances the scope and depth of intelligence available. Selected personnel from platoons and sections should be familiarized with intelligence activities to enable these units to exploit their information collection capabilities when deployed independently. Artillery may be tasked to conduct reconnaissance by fire and to provide cover and deception.

c. Counterintelligence efforts must be emphasized to prevent sabotage and compromise of artillery personnel, materiel, and information. This problem is particularly acute for small dispersed units. Counterintelligence support may be requested from supporting military intelligence organizations.

#### 8809. MILITARY CIVIC ACTION

Artillery units contain personnel with specialized skills which may be used profitably in military civic action; however, imagination must be given free play to cope with unusual situations. Programs that may use the versatile capabilities of artillery units include, but are not limited to, those discussed below.

a. The communication facility organic to U.S. units may be used to augment the existing communication system or to provide a temporary communication system for civil use in remote areas. Artillery units can furnish wiremen, switchboard operators, and telephone operators with necessary equipment, installation, and repair capabilities to augment civilian facilities, particularly within the perimeters of consolidated areas. Technicians are available who are capable of installing, operating, repairing, and supervising radio and radio teletypewriter communication media.

b. The unit survey section, with additional training, can assist military civic action projects by surveying for unsophisticated roadways, bridges, building sites, airstrips, and other installations.

c. Transportation available in artillery units can be used to assist the local government and the civilian populace. Although the number of mechanics within an artillery unit is limited, some instruction and supervision can be offered to host country personnel.

d. Administrative assistance can be provided to the local government from organic sources, although this capability is limited.

#### 8810. PSYCHOLOGICAL OPERATIONS (PSYOP)

Psychological operations are a command responsibility. They include all actions designed to influence the attitudes and behavior of hostile, neutral, or friendly groups in such a way as to support the achievement of national objectives. Psychological operations media include loudspeakers, radio, television, printed matter, movies, and face-to-face communications.

a. Artillery Units.--Artillery may be used to provide a psychological impact in addition to the actual damage caused by fire. When directed, Marine Corps artillery units may participate in planned psychological operations and demonstrations. For example, firing demonstrations show how quickly and accurately on-call artillery can respond to calls for fire. Also, artillery projectiles and aircraft may be used to disseminate psychological operations leaflets and other printed media. Artillery permits accurate distribution of this material regardless of the weather conditions. Other tasks that may be performed by artillery include:



(1) Instructing individual Marines on the importance of maintaining good relationships with the civilian population to increase the information of intelligence value provided by civilians.

(2) Reporting actions and conditions which may be exploited. These may include indications of low morale of the hostile force and actions by friendly forces that improve the living conditions of the civilian population.

b. Psychological Operations Units.--Personnel from psychological operations sections may assist units in planning and providing propaganda support such as leaflets, loudspeaker and audiovisual teams, and target information. In addition, psychological operations sections plan or coordinate the aerial dissemination of printed material and aerial loudspeaker broadcasts.

#### 8811. ADVISORY ASSISTANCE

a. In the initial phase of any insurgency, Marine Corps artillery personnel may be organized into mobile training teams (MTT) to train host country artillery units. Normal tasks performed by the MTT may include:

(1) Providing instruction in maintenance and operation of equipment, assisting in establishing logistics and services systems, and recommending civic actions and community relations programs.

(2) Providing assistance and advice in organizing and equipping units and in preparing plans and training programs.

b. Assistance from Marine Corps artillery units may include advice on military organization, training, operation, doctrine, and materiel, thereby contributing to the effectiveness of the host country forces.

c. Personnel assigned as advisers to host country artillery units must understand artillery capabilities in general and specific techniques that are peculiar to the use of artillery in counter guerrilla operations. Areas requiring special attention in counter guerrilla operations are weapon characteristics, ammunition, mobility, calls for fire, patrol support, harassing and interdiction fires, selection and preparation of positions, coordination of fires, and care and maintenance of equipment.

(1) Mobility.--In addition to the normal artillery prime movers, other means of transport may be used. The adviser must use imagination and ingenuity when normal prime movers are unavailable or when their use is impracticable.

(a) Landing Craft and Boats.--Operations conducted in large inundated areas or in areas bisected by navigable streams and rivers can be supported by artillery through the use of landing craft and boats as prime movers.

(b) Helicopters.--Towed weapons up to and including the 155mm howitzer can be lifted by helicopter. Helicopter transport permits the use of artillery in almost any operation where terrain and the enemy situation are deterrents to normal ground mobility. Whenever possible, reconnaissance for positions should be conducted. Ammunition resupply should have priority when helicopters are used for artillery transport.



(c) LVTP-7.--In marshy, inundated areas, the LVTP-7 affords an excellent means of positioning artillery.

(2) Calls for Fire.--A simple method by which defenders can call for artillery fire should be devised. The method must be easily understood by villagers, and the call for fire must be easy to transmit over the local friendly communication system. An example of an aid that can be used to assist relatively untrained paramilitary personnel in calling for artillery fire in the event their post or hamlet is attacked by guerrilla forces is a round board divided into quadrants, with each quadrant painted a different color. The first quadrant may be red; the second quadrant, white; the third quadrant, blue; and the fourth quadrant, yellow. The board is permanently mounted in the village and is oriented on north-south line. Defenders can call for fire by using a color to indicate direction. This method requires close coordination with artillery units and as many preplanned targets as possible. Another example is the target indicator. The target indicator is located permanently where there is good observation and is oriented by grid azimuth. On it are depicted preplanned targets and prominent terrain features. When under attack, the defenders position the movable arrow in the direction(s) of attack and call for fire, using either a polar or the preplanned target nearest the enemy force. The amount of detail depicted on the target indicator can vary, but too much detail should be avoided to minimize confusion. The distances to terrain features can be shown to enable the defenders to give a more accurate polar plot. A member of the supporting artillery unit should orient the target indicator in the post or hamlet and instruct defenders on its use. As many potentially capable individuals as possible should be trained in its use. Check rounds should be fired periodically on the planned targets, especially those in proximity to the post or hamlet, to ensure accurate fire in the event of attack. More sophisticated methods can be devised, depending on the time allowed for training and the receptiveness of trainees to instruction. Any method requires reliable and responsive communications. The techniques of using a small plotting board at the observation post may be considered. This technique can easily become an all-weather observed fire (OF) fan, terrain sketch, and visibility diagram all in one.

(3) Patrol Support.--Active patrolling in an area where counter-guerrilla operations are being conducted is mandatory. Whenever possible, artillery support of patrols should be provided. The support must be carefully coordinated before the patrol begins. The supported commander must provide the artillery unit such information as the size of the patrol, the time of departure and return, the mission of the patrol, the routes to be used, and any special instructions. Patrols should report locations in accordance with a time schedule or when they have moved a significant distance. Prearranged fires may be planned on critical areas. As a minimum, the patrol route should be indexed to match prominent or easily identifiable terrain features from which the patrol leader may reference calls for fire.

(4) Harassing and Interdiction Fires.--Artillery fire, because of its psychological effect on insurgents, should be employed to the maximum in the harassing and interdiction role. Targets for harassing and interdiction fires can be obtained from many sources to include maps of insurgent-controlled areas, informers, and patrol reports. Infantry commanders and district leaders should stress the importance of having patrols locate and record suspected insurgent routes and installations. Patrols should be ordered to record coordinates of deserted camps, villages, or areas which appear to be insurgent training areas. Such locations should be fired on

from time to time in order to curb insurgent movement, to deny insurgents use of the areas, and to lower insurgent morale. Targets for harassing and interdiction fires must be carefully selected in order to ensure the safety of local inhabitants.

(5) Selection and Preparation of Positions

(a) To the maximum extent possible, artillery positions should be selected to afford a 6,400-mil firing capability. Care should be taken not to mask artillery fires when the positions are in or near built-up areas. Although position security is a primary consideration, the ability to perform the mission is the paramount consideration.

(b) Improvement of the position area is continuous. However, improvement should not result in a cannon parapet which precludes the ability to conduct direct fire.

(c) Alternate position areas should be selected throughout the friendly locale to add flexibility to the employment of artillery. In order to deny the insurgents advance knowledge of the locations of alternate position areas and the opportunity to mine or make plans for ambush, the areas should not be prepared. Artillery should move intermittently to within range of areas in which insurgents feel secure (out of normal artillery range) to keep the insurgents off balance and disrupt their activities.

(6) Coordination and Control of Fire

(a) Coordination between the supported force and the supporting artillery is vital. Artillery may be attached to or in direct support of the supported force. As a minimum:

- 1 Communications are established.
- 2 Call signs are arranged.
- 3 Weapon capabilities are explained to the supported force commander.
- 4 Forward observers and liaison officers are assigned.
- 5 Fire planning is accomplished.

(b) Control of fire is the inherent responsibility of the force commander, who delegates authority to coordinate fire support to the fire support coordinator. The fire support coordinator has knowledge of the scheme of maneuver and the disposition of friendly forces and is able to render quick decisions on calls for fire. Calls for fire must be answered as quickly as possible. Restrictions imposed by force commanders that unduly delay delivery of artillery fire should be examined and explained to host country counterparts immediately upon discovery in an effort to have such restrictions removed. Firing demonstrations may be conducted to prove the worth of artillery to, and build confidence in, the host country counterparts.

d. When advising a host country counterpart in the planning of an operation that includes artillery, the adviser must ensure that the unit assigned the mission is able to accomplish the specific, inherent fire support responsibilities of that mission.

## Section IX. HELICOPTERBORNE ARTILLERY OPERATIONS

## 8901. GENERAL

a. Helicopterborne artillery is transported by aircraft in a tactical configuration to accomplish the artillery mission. Artillery must possess mobility equal to or greater than that of the supported force. Helicopterborne artillery supports elements of the force by providing surface-to-surface fires.

b. This section provides guidance for commanders and staff officers in planning and executing their movement of artillery with helicopters.

## 8902. CONCEPTS OF EMPLOYMENT

a. Artillery movements in which helicopters are used as the primary means of transport are conducted as tactical moves and may be executed during daylight or darkness. Helicopter movement of artillery has application in all types of operations and is used to rapidly launch units into battle in support of the maneuver force, to overcome natural and manmade obstacles that would otherwise prevent occupation of position, to facilitate rapid displacement of units over terrain inaccessible to wheeled and tracked vehicles, to bypass enemy troop concentrations, and to position units to facilitate future operations. However, in consolidation operations, helicopterborne artillery may remain in positions which may be resupplied by helicopter for relatively long periods of time.

b. Helicopter movement of artillery is characterized by detailed planning and coordination, aggressive execution, speed of displacement, and operation with minimum personnel and equipment for periods of short duration.

c. Helicopter movement of artillery is conducted in four phases--planning, loading, movement, and occupation of position. The planning phase consists of coordination with supported and supporting units, fire planning, reconnaissance and selection of positions, preparation and issuance of orders, and rehearsals, when the situation permits. The loading phase consists of ground movement to appropriate pickup areas as required; preparation of the helicopter loading areas within the position area; preparation of troops, equipment, and supplies; and loading of helicopters preparatory to actual movement. The movement phase consists of the actual move from the loading area to the landing site. This phase commences with takeoff of the first helicopter and ceases with arrival of the last helicopter load at the landing site. The occupation of position phase includes the organization of the helicopter landing site by an advance element, unloading of personnel and equipment, and occupation of the position.

d. An artillery battalion in a helicopterborne operation may be assigned the standard tactical mission of direct support, reinforcing, general support, or general support-reinforcing. Modified or nonstandard tactical missions may also be appropriate.

e. An artillery battalion is normally placed in direct support of an infantry regiment and is employed to cover the entire area of operations of the supported regiment. The depth of the objective and the mission of the supported force are major factors in the determination of the amount, type, and positioning of artillery to support the operation.



f. The artillery battalion commander providing direct support, or his liaison officer, is normally the fire support coordinator for the regiment and is located where he can best coordinate all fire support means available to the regiment and ensure that fires are planned and delivered in accordance with the plans and needs of the force.

(1) The command post of the artillery battalion in direct support may be collocated with the regimental command post or with one of the howitzer batteries supporting the force.

(2) A minimum of one howitzer battery is positioned to provide support throughout the zone of a committed combat battalion. Mutual support between artillery batteries is desirable. Batteries may be required to operate independently for a short period of time to support small task forces in helicopterborne operations. It may be necessary to augment such batteries with personnel and equipment.

(3) Artillery units must be flexible and capable of moving with extremely short leadtimes in various types of aircraft. Units must establish standing operating procedures and conduct training in these procedures.

g. Armed helicopters are usually assigned the mission of providing security to transport helicopters in helicopterborne operations and of delivering fires in the landing zone just prior to the arrival of the force. Armed helicopters also provide a means of supplementing and extending the fire support capability of the ground commander.

#### 8903. PLANNING

The success of any helicopter movement of artillery depends largely on planning. The length and detail of the planning phase depend on the urgency of the situation. Planning is materially enhanced by the development and rehearsal of the SOP and by frequent briefings. Briefings should include information on present and future operations, current sortie requirements, data on weather and terrain, and a review of possible landing zones in the area of operations. The planning phase of the movement begins immediately upon receipt of the warning order and continues through commencement of the movement. In addition to the concept of operations, major considerations involved in planning the movement are command and control; coordination; organization of the unit consistent with the mission; reconnaissance and selection of ground and air routes, loading areas, landing sites, and position area(s); preparation of helicopter employment loading tables (HELTS); resupply requirements; and preparation and issuance of the unit operation order. Specific instructions and deviations from the SOP are provided for by fragmentary orders and prearranged messages.

a. Command Relations.--The artillery unit is usually allocated helicopters on a mission basis by sorties, and the relationship between the helicopterborne artillery commander and the helicopter unit commander is one of coordination only.

b. Coordination.--Coordination relative to the artillery helicopterborne movement should be conducted on a continuing and aggressive basis throughout all phases of the operation. A helicopter support team (HST) may be provided to the artillery unit to assist in the technical aspects of planning and executing helicopter movement and to supervise rehearsals, preparation and distribution of equipment in the loading area(s), loading and unloading, and signaling relative to the air movement. Continuous



liaison must be maintained between the artillery unit and the helicopter unit during all phases of the movement to include agreement on sortie requirements, radio frequencies, flight routes, armed helicopter escort requirements, desired landing zone characteristics, load configurations, and distribution of equipment for movement.

(1) The unit to be airlifted is responsible for rigging its loads for movement, to include providing all slings, ropes, and nets. The aircraft crewchief inspects the load for airworthiness. The aircraft commander is responsible for airworthiness, securing internal loads in the helicopter, and providing the necessary means to do so. Cargo straps are organic to the helicopter unit and are carried aboard the aircraft.

(2) Specific areas of responsibility of the various units must be specified and made known to all concerned.

c. Organization for Movement.--Organization of the artillery unit for helicopter movement is an integral part of the planning phase and depends on the type of extraction employed and the type of aircraft available.

(1) The helicopterborne artillery unit normally displaces in three echelons during movement. These echelons are designated the assault echelon; the resupply, or followup, echelon; and the rear echelon.

(a) Composition of the assault echelon of a unit varies with the assigned mission, aircraft available, and duration of the operation. The assault echelon consists of battery elements that are essential to the control and/or the delivery of immediate fire support from the objective area.

(b) The resupply, or followup, echelon consists of the combat support personnel, supplies, and equipment necessary to sustain the assault echelon until linkup or extraction occurs. These necessities are transported to the assault echelon by air and/or surface means.

(c) The rear echelon consists of the rest of the force, which may remain in a rear area or aboard ship until termination of the operation or accompany the linkup force. The rear echelon may be charged with the responsibility of ensuring that resupply of the assault echelon is accomplished.

(2) In both categories of extraction, extraction to assault and extraction from contact, firing elements in the pickup zone retain the capability of processing fire missions as long as possible.

(3) The success or failure of an operation may depend on the adequacy of each echelon of the helicopterborne artillery unit. Therefore, emphasis should be placed on the selection of personnel and equipment for each echelon, and responsibilities should be assigned to the most essential personnel consistent with requirements imposed by the assigned missions.

d. Reconnaissance

(1) In helicopterborne operations, a physical reconnaissance of artillery position areas should be conducted, if possible, during the planning phase. However, physical reconnaissance frequently may be prohibited

due to the unavailability of aircraft, the speed of operation, or a requirement to maintain surprise and security. The commander must be prepared to move his unit with only limited information available. Physical reconnaissance by air, when feasible, is conducted in accordance with established principles. The reconnaissance provides needed information on the new position area to include alternate landing zones, terrain, routes of communication, enemy situation, location of friendly troops, and flight routes. It may be necessary for the artillery commander to conduct reconnaissance during the assault with elements of the supported force.

(2) The positions selected must permit the unit to accomplish its mission. The versatility of helicopterborne techniques makes possible the emplacement of artillery in positions previously considered inaccessible. Weapons can be placed on top of a ridge, among tree stumps, along riverbanks, or in other positions where there is room for the howitzers and sufficient clearance for helicopter rotor blades. An additional landing area is required for cargo helicopters transporting internal loads. Battery formations are often dictated by the terrain. Individual piece corrections may be necessary to obtain the desired effect in the target area. Other factors affecting the selection of positions are weather and the tactical situation. Desirable characteristics of helicopterborne howitzer battery position are:

- (a) Dry, well-drained ground; an area within or adjacent to the battery position that can accommodate cargo helicopters, when required.
- (b) Terrain suitable for defense and located within the infantry perimeter (when such location will not interfere with the mission of either unit).
- (c) All-round (6,400-mil) firing capability.
- (d) Maximum defilade consistent with the accomplishment of the assigned mission.
- (e) Proximity to natural obstacles.

(3) The following factors should be considered in selecting helicopter landing zones within or adjacent to artillery positions from maps, air photographs, and physical reconnaissance:

- (a) Size of the landing zone. Specific dimensions of the area required for landing and maneuvering helicopters vary with the size of the helicopter, the lift formation, the altitude of the area, and the tactical situation.
- (b) Surface conditions. Surface conditions should be such that the landing area is not obscured by excessive dust when the helicopter begins to hover and such that the helicopter does not bog down upon landing. Loose debris that may cause damage to the engine or rotor blades should be removed.
- (c) Navigational aids. If navigational aids are not available and the landing zone is not easily identifiable from the air, navigational aids, such as planes, strobe lights, smoke grenades, radios, and radars, should be available to vector aircraft to the desired locations.

### e. General Considerations

(1) In a helicopterborne operation, the primary means of tactical communications is FM radio. Wire communications are normally restricted to installations within the landing zone and to base camps in rear areas. Reliable communications are essential to the precise timing and execution of airmobile operations.

(2) Reconnaissance teams and HST's may be used to aid in the terminal guidance and control of helicopters supporting the artillery movement. Reconnaissance personnel and HST's are trained and equipped to establish and operate electronic and visual navigational aids to assist the helicopter crews in locating a designated facility within a landing area; furnish ground-to-air voice radio communications to the helicopters for the purpose of providing information, guidance, and control; reconnoiter for and recommend suitable drop or landing zones; and assist in the assembly of airlanded forces. When reconnaissance or HST personnel are not present, terminal guidance must be accomplished by artillery personnel of the moving unit, who use equipment which is available or improvised. Artillery personnel organize their respective areas and maintain contact with the supporting helicopters.

(3) Positioning of loads according to a standard plan reduces the number of air-to-ground transmissions and personnel briefings and the amount of coordination. Loads should be positioned to reduce flight over the battery as much as possible. All equipment should be positioned so that the aircraft can approach into the wind. Wind direction takes precedence over battery overflight.

(4) The HST personnel, when providing instructions and information to helicopter pilots in flight, should be in a position where they can observe the aircraft, the loads, or the ground markers.

(5) Marking devices available to the artillery unit are air-ground recognition panels and vests and smoke grenades. An easily identifiable point of reference (e.g., a T-marker) should be established as a reference point to vector the aircraft to a specific point in the pickup or landing zone.

(6) Helicopters may be directed to specific loads or locations by radio transmissions. This method, however, is slow and requires many transmissions. A color-code system may be employed instead. Each load, including howitzers, is assigned a color, which is conspicuously displayed on the load. The guide in the landing zone wears an air-ground recognition vest or uses an air-ground recognition panel of the same color as that assigned the load. The pilot is told the color of his load prior to reaching the pickup zone. En route, he notifies the HST of his load color and proceeds directly to the marked site or to the appropriate guide, who guides him to the position.

(7) Helicopters can be guided to their pickup or release points by a guide on the ground or by the crew chief in the helicopter. The results are the same; only the manner in which the pilot is informed differs. The method to be used should be selected before the move starts.

(a) A ground guide instructs the pilot by arm-and-hand signals. During daylight operations, he wears a colored vest; at night, he



uses colored lights or illuminated batons. The reference point used to guide the helicopter is the load or marker.

(b) The crew chief observes the load or the panel marker through the helicopter hook hatch and directs the pilot to the pickup or release point by means of the helicopter intercom. During daylight operations, a panel marker or color-coded load may be used as a load or drop point marking device. At night, colored landing lights are used to mark the load or drop point.

#### 8904. LOADING

Loading may commence during the planning phase and continue through the movement phase. It includes preparation of the pickup zone and the control of incoming aircraft. With no prior preparation, initial loading should begin at least 2 hours prior to the arrival of the first aircraft. The battery should retain its firing capability as long as possible under the existing conditions.

a. Preparation of the Pickup Zone.--Preparation of the pickup zone includes rigging loads, positioning marking devices, and positioning equipment for rapid pickup. Loads are inspected for completeness and compactness.

(1) A colored marking device is used to guide the helicopter to the location of the specific load for pickup.

(2) The howitzer is positioned with the tube into the wind. Its accompanying ammunition is so placed as to take advantage of local terrain and obstructions and to facilitate use of the smoothest path to liftoff as well as liftoff itself. Sliding rigging under the weapon's trails and placing the bag to the rear is the best positioning because it minimizes helicopter roll and pitch on liftoff. Additional ammunition is packed and placed in a central location.

(3) Sling loads may be placed anywhere the helicopter can hover for hookup. Tents within 50 to 75 meters of the landing site or along the approach path should be lowered and secured.

#### b. Control of Aircraft

(1) Prior coordination will have established the number of helicopters supporting the movement. Assistance in controlling the helicopters may be obtained from HST organic to the landing force.

(2) In the absence of HST, the artillery unit controls the incoming aircraft in the pickup zone. The unit furnishes the flight with information concerning the enemy situation, wind direction and velocity, surface conditions, and landing direction and clearance, and may furnish the landing site azimuth, field elevation, landing formation, and other information as required.

#### 8905. MOVEMENT

a. Final coordination and briefings are completed prior to liftoff of the advance party helicopter. If the artillery commander is in the forward area, the executive officer briefs the flight leader. The flight leader must know the location of the landing zone, the radio frequency used for the move,



the location of artillery firing along the flight route, the call sign of the HST in the landing zone, the order of march, and the number of sorties.

b. The interval between arrival and departure of helicopters will depend on the plan of maneuver, the conditions in the landing zone, and the number of helicopters the landing zone will accommodate. The advance party helicopter for a battery may be followed in as short a time as 5 minutes by the remainder of the battery, or the battery may await the battery commander's order to move forward.

c. Correct timing is essential in order to keep helicopter orbit and ground times to a minimum.

d. During the approach to the landing zone, passengers should orient themselves by observing the landing zone through ports in the helicopters. Mounting and dismounting from the helicopters should be as rapid as possible to reduce helicopter ground time.

#### 8906. OCCUPATION OF POSITION

a. During the planning phase for a battery operation, the battery commander tentatively selects locations of key installations, plans the organization of the prospective landing zone, and coordinates procedures for control of aircraft during the occupation.

b. Prior to departing the pickup zone, the battery commander briefs the advance party on the new landing zone, the order of march, and the howitzer formation to be used.

c. Immediately after the advance party arrives in the landing zone, the battery commander or his representative designates battery center and confirms the howitzer information to be used. The location of the T-marker depends on established SOP. A guide from each howitzer section clears his immediate position area of any loose debris and obstacles and prepares the position to receive the equipment. Each guide displays a marking device of the same color as that assigned to his section.

d. If HST personnel are not on the ground or at the landing site, the battery commander or his representative gives the pilot the color to guide on and the normal landing information as discussed in paragraph 8904.

e. Ammunition should be placed close to the howitzers during occupation.

f. Once the battery is on the ground, standard firing battery and fire direction procedures are followed.

g. The only elements necessary for positioning aircraft on return trips are approach instructions, artillery firing information, and a guide.

## Section X. COLD WEATHER OPERATIONS

## 81001. GENERAL

Artillery units operating in northern areas are faced with two main problems--mobility and survival. Movement (see par. 81004) is a greater problem during the warmer months than during the colder months. The season of the year, equipment, and training affect the survival problem. Shelter and heat are major requirements for personnel operating in snow and extreme cold. Concentrations of shelters make profitable nuclear targets. The use of nuclear weapons may produce an unusually large number of casualties because of direct effects of the explosion, secondary fires, and subsequent exposure to extreme cold. In areas where the ground is frozen and no snow exists, personnel are particularly vulnerable to nuclear attack.

## 81002. PLANS AND PREPARATION

Personnel and equipment must be made available well in advance of operations in a northern area so that training can be conducted under conditions similar to those anticipated in the area. Personnel must be in peak physical condition and trained in their primary duty prior to entering areas of deep snow and extreme cold. Special equipment must be used, and all equipment must be winterized and equipped with modification kits prior to arrival in extremely cold areas.

## 81003. SURVEY

Survey in snow and extreme cold is slow and tedious. Lenses quickly become fogged. Computation of data is expedited when temporary shelter is provided. Control points are difficult to locate and will normally be found only along well-established roads and railroads. Because of deep snow, crevices, and other obstacles natural to arctic terrain, it is often simpler and faster to run a survey by following existing roads and trails, even though the cross-country distance is considerably shorter. The use of electronic equipment, such as distance measuring equipment (DME), makes survey more feasible.

## 81004. MOVEMENT

In northern areas, movement is affected by the varying types of terrain. Large areas are covered with coarse vegetation and boggy muskeg. Roads are scarce, and the heavy snow and swamps restrict movement of wheeled vehicles. The best time of the year for cross-country movement of heavy vehicles is during the latter part of the freeze-up period and the first part of the winter period prior to the arrival of heavy snow. The use of oversnow vehicles increases the mobility of the supply and reconnaissance echelons of the artillery unit. Self-propelled weapons are more maneuverable than towed weapons; however, the present self-propelled weapons are too heavy to traverse deep snow in winter or muskeg in summer. In the summer, movement on waterways, such as lakes and rivers, is often possible. Extensive use should be made of helicopters in moving artillery.

## 81005. POSITIONS

a. Supply difficulties greatly influence the selection of position areas. Positions are chosen for their tactical utility and for protection

from the elements. Prior to occupation of a position, the terrain should be carefully reconnoitered; and weapon positions, traffic lanes, and snow parapets should be prepared. When the situation permits, artillery in direct support should be located adjacent to or within the perimeter of infantry elements. During the winter period, it is impossible to dig in a position, but parapets of snow and ice can be erected. In extreme cold, some type of heated shelter will be required for personnel whose duties must be performed in the open.

b. Camouflage discipline must be strictly enforced. Limited camouflage can be obtained by application of paint. Tracks left in snow cannot be effectively covered except by fresh snowfall. Therefore, vehicles and troops must move only on designated trails and roads.

#### 81006. OBSERVATION

a. During the winter months, good observation is limited to a few hours each day because of the short periods of daylight. Snow cover reduces depth perception and obscures ground features and landmarks. Glare of the sun upon the snow is intense, and unless personnel are wearing dark glasses, continued exposure will cause painful snow blindness. Observing instruments must be equipped with amber filters to reduce eyestrain. Personnel operating observing instruments must be relieved frequently or provided with shelter. Forward observer teams should be trained in the use of oversnow equipment and in rock-climbing techniques.

b. Extensive use of aerial observation is required. Aerial observers are invaluable for reconnaissance, location of targets, and adjustment of fire.

c. Standard countermortar radars and surveillance radars, like other electronic equipment, are sensitive to extremely low temperatures. When temperatures are low, heat must be applied to the console before it will operate. A heated shelter is required for plotting personnel.

d. Sound recorders are not affected by low temperatures. Microphones will function satisfactorily at low temperatures and under 4 to 6 inches of dry snow. The time required to establish a sound base in arctic regions is normally four to five times that required under normal conditions.

#### 81007. ARTILLERY FIRES

a. At times, especially during extremely cold periods and periods when temperature changes are sudden, the ballistic characteristics of weapons and ammunition are affected. During extremely cold periods, a K factor of 100 meters or more per 1,000 meters of range is not uncommon. Fuze quick is ineffective in deep snow, as up to 80 percent of the fragmentation is absorbed by the snow cover; however, such fires may often be used effectively to initiate avalanches in enemy areas. An airburst with either a variable time (VT) or mechanical time fuze is most effective against personnel in the open. Although VT fuzes are adversely affected by extreme cold and there is an increase in the number of malfunctions, the VT fuze is one of the most effective fuzes for the arctic. Information concerning the effects of nuclear weapons in snow is contained in the FMFM 11-4 series of manuals; the FMFM 11-3 series contains information concerning chemical weapons effects.



b. Deep snow may have an adverse effect on chemical agents; however, when the snow melts and is churned up, the chemical agent may pose a threat once again. Smoke and riot control canisters from a base-ejection shell may be smothered in the snow. The phosphorous shell will produce the desired smoke, but the phosphorous particles buried in the snow may be a hazard until the snow disappears.

c. During extreme cold, the rate of fire will be slow until the weapons have warmed; this is especially true of weapons that have a hydro-pneumatic-type recoil. Preparation of ammunition is slow when temperatures are low because of the reduced efficiency of personnel.

#### 81008. COMMUNICATIONS

a. Radio is a rapid and useful means of communication in northern areas. However, dry and wet cell batteries are seriously affected by extreme cold, both in storage and in operation. The efficiency and life of batteries decrease in direct ratio to the temperature.

b. Wire lines are normally restricted to existing trails and roads and are vulnerable to all existing hazards. Poles are broken by storms or uprooted by frost heaves. Wire laying by aircraft is economical. This method should be employed when practicable. It is usually less time-consuming to lay new lines than to attempt to repair old ones. Wire must be stored in a warm place up to the time of laying.

#### 81009. MAINTENANCE

Maintenance is critical in northern operations. Careful monitoring of the use of vehicles and equipment, regular maintenance, and the use of arctic lubricants are necessary. Care must be taken in the disassembly of howitzers to prevent parts from freezing. If parts freeze, they cannot be reassembled. Ammunition, particularly proximity fuzes, must be stored carefully.



## Section XI. RIVERINE OPERATIONS

## 81101. DEFINITIONS

a. Riverine Area (Environment).--A riverine area is an inland area with an extensive network of rivers, canals, streams, irrigation ditches, paddies, and/or swamps extending over broad, level terrain, parts of which may be inundated periodically or permanently. It may include sparsely populated swamps or forests, places where rivers and streams have steep banks densely covered with tropical trees or bamboo, and locations where the terrain is relatively flat and open. A large agrarian population may be concentrated along the waterways. Riverine areas near the ocean are affected by the tides.

b. Riverine Operations.--Riverine operations include all military activities designed to achieve and/or maintain control of a riverine area by destroying hostile forces and restricting or eliminating hostile activities. Operations are characterized by the extensive use of water transport to move military forces and equipment. Friendly ground forces may operate with Navy river forces; Navy, Marine Corps, or Air Force support units; or host country forces.

## 81102. GENERAL

a. Environmental and tactical situations vary greatly in riverine operations. The environment varies with the tides and seasons. The variations in environment complicate operations conducted in an area with many differences in terrain.

b. Limited mobility in the riverine environment restricts certain aspects of combat support. Although support requirements are no more severe than normal, immediate response is essential. Units may be widely dispersed and, due to environmental restrictions, may not be mutually supporting. The lack of dry land, which many units need to accomplish their missions, may require the force commander to establish priorities for the use of suitable and available land by unit/agency to facilitate planning and prevent confusion.

c. The nature of riverine operations creates several environmental factors which challenge the ways and means of providing artillery support. These factors include inadequate survey control, poor maps, insufficient dry land for artillery position areas, lack of valid meteorological data, and curtailed ability to mass fires when fire direction is necessarily decentralized.

d. Normal artillery tactics do not change. However, the techniques of employment artillery may change to fit the situation and terrain. Artillery operations in riverine areas may differ from those in other land warfare areas.

(1) Artillery may have to be prepositioned in hostile areas before the attack begins. Movement of the artillery and occupation of position will be conducted as an infantry-type operation with air/naval gunfire support and other artillery support. Additional forces for the security of the prepositioned artillery may be required.

(2) As in other ground operations, artillery is organized for combat in accordance with the requirements of the operation. However, lack of adequate position areas and the requirement for use of water transport may limit the quantity and caliber of weapons to be employed.

(3) Position areas may be small and in insecure locations.

(4) Batteries must be prepared to use all available means of transportation during an operation.

(5) Absence of positions in defilade, lack of cover and concealment, and positioning in insecure areas necessitate use of direct fire techniques and antipersonnel ammunition.

(6) Artillery may not be able to deliver accurate fires without adjustment due to a lack of survey control and valid meteorological data.

e. A complete discussion of riverine operations is presented in FMFM 8-4, Doctrine for Navy/Marine Corps Joint Riverine Operations, and FMFM 8-4A, Operations in Riverine Areas.

#### 81103. MOVEMENT

a. Movement of the artillery in the riverine environment is accomplished primarily through the use of landing craft and helicopters. Current manuals adequately describe procedures for land and helicopterborne movement.

b. The force commander allocates landing craft for use by the artillery.

c. The battery/battalion commander and the transporting unit commander must coordinate their plans and movements with the forces providing air or artillery support and security.

d. Battery commanders/executive officers and naval commanders must ensure that the course is independently and continuously plotted and must verify their positions with each other. This procedure ensures accuracy of location if and when emergency occupation of position is necessary.

e. Air and artillery support, an aerial observer, and a radio relay capability are required for all artillery movements.

f. Buoy markers should be placed on howitzers and prime movers to facilitate recovery if equipment sinks.

g. The naval element, using gunboats and assault support patrol boats furnishes boat security for the floating prime movers. Armed helicopters, tactical air, supporting artillery, and host country forces may provide additional support and route security on request.

h. A system of checkpoints is necessary to facilitate locating the water column during the move. Naval radar systems on board escort watercraft can be used by the artillery commander to provide position locations.

i. Current tidal information must be considered in conducting waterborne movements.

## 81104. POSITIONS

- a. The fundamentals of positioning cannon battalions and batteries specified in chapter 5 apply to riverine operations.
- b. When supporting an operation, batteries should be located in the combat area when possible.
- c. When the artillery is not waterborne during the rainy season, positions must be selected along canal and riverbanks and existing roads to the extent possible.
- d. Desirable qualities of firing positions for barge- or boat-mounted artillery are:
  - (1) Steep banks below the surface of the water to minimize listing as the tide causes the water to fluctuate.
  - (2) Wide streams to the front or rear to reduce the danger of hand grenades and small arms fire, and to allow the use of antipersonnel ammunition.
  - (3) Limited avenues of approach over land.
  - (4) Areas that minimize anchorage problems. Areas of strong currents should be avoided when possible.
- e. During some operations, it may be necessary to erect firing platforms on which to emplace weapons in swampy terrain.

## 81105. OBSERVATION

- a. Aerial observation in the riverine environment, particularly during all waterborne movements, is essential due to the lack of commanding terrain.
- b. Coordination between aerial observers and forward observers on the ground ensures the best artillery coverage, coordination, and surveillance of the battle area.
- c. Techniques and procedures for all types of observation apply to riverine operations.
- d. Artillery forward observers must be able to adjust naval gunfire. Coordination of frequencies and circuits for obtaining naval gunfire is necessary before each operation. Current artillery procedures are used to adjust river assault group fire.

## 81106. FIRE SUPPORT COORDINATION

a. Fire Direction

- (1) Fire direction and fire planning in riverine operations follow conventional methods. Fire direction should be centralized at battalion when possible. However, widely dispersed operations and special task assignments may dictate fire control and fire direction under battery control.



(2) If afloat, battery and battalion fire direction centers are generally semipermanently installed on separate landing craft.

b. Coordination

(1) Current doctrine prescribing techniques and procedures for planning and coordinating fire support is valid for riverine operations. Additional coordination and planning may be required before and during operations, because the forces of two or more services and/or nations may be involved.

(2) The company commander coordinates his own fire support and integrates available fire support with his scheme of maneuver or plan of defense.

(3) At battalion and regiment, the FSCC is located at the maneuver command post.

81107. FIELD ARTILLERY EMPLOYMENT

a. Self-Propelled.--When the self-propelled 155mm howitzer M109A1 is employed from the LCM-8, it may be fired while the LCM-8 is underway or anchored to the bank. However, structural damage may develop to the LCM-8. The M109A1 howitzer has a 6,400-mil capability when employed from the LCM-8 and affords armor protection for the crew. Use of the M109A1/LCM-8 combination eliminates the need for additional boat space for prime movers.

b. Towed.--Towed 105mm howitzers can be mounted on 90-foot by 30-foot barges or pontoon causeway sections (6 feet by 6 feet). One LCM-8 landing craft is used as the prime mover for each barge. The barge is positioned against the bank so that the howitzer can be laid in the normal manner. Aiming post, with extensions, or collimators are placed on the banks to provide aiming references. The FDC for barge-mounted batteries is usually located in the well deck of the LCM-8 used to transport one of the barges. Wire communications from the FDC to the executive officer's post are used for transitting fire commands. Wire communications are also used between the executive officer's post and the guns.

81108. SURVEY

a. The absence of survey control in the riverine area necessitates the use of observed firing charts.

b. Support of water movements and patrols requires emphasis on the preplotting of targets and the establishment of control points from which firing data can be transferred.

c. If survey control points are available and a unit is in an area of operations for a sufficient length of time, the distance-measuring equipment is used. The flat riverine terrain facilitates use of this equipment. Survey parties, augmented with security forces and using boats or helicopters, can establish survey control points.

81109. AMMUNITION

The size of the ammunition loads of howitzer sections depends on the mode of transportation used. Artillery barges are capable of carrying from



1,200 to 1,500 rounds in their integral ammunition storage areas. The size of the ammunition loads carried by landing craft and boats depends on the draft and cargo capacity of the craft and the number of craft available. The amount of ammunition delivered by helicopters is limited to the allowable cargo load.

## Section XII. AIR MOVEMENT OPERATIONS

## 81201. GENERAL

Artillery units participating in air movement operations should land in areas which are reasonably secure. Air delivery of artillery materiel is difficult and involves many risks. Artillery delivered by parachute must be carefully planned and coordinated to prevent loss of equipment and delay in providing fire support. This section discusses only those facets of air movement and air delivery operations which pertain to artillery. (See also FMFM 4-6, Air Movement of FMF Units.)

## 81202. TRANSPORT AIRCRAFT SUPPORT

Transport aircraft support is available to the artillery from diverse sources. The source of support for any operation will be determined essentially by its scope, magnitude, location, and the commands involved. The Fleet Marine Forces have specific and unique requirements and responsibilities in the area of tactical air logistics and combat air transport support. Marine aviation units provide limited means to execute these responsibilities by assault air transport of personnel and equipment. Transport aircraft for logistic, medical evacuation, airborne, and special airline operations are available from the following sources:

- a. Military Airlift Command.
- b. Army aviation.

## 81203. PLANNING SEQUENCE

Planning for an air movement operation is essentially reverse planning. The planning sequence begins with the commander's concept of operations in the objective area and the tactical plan which is developed from his concept.

a. Tactical Plan.--In the development of the tactical plan, it is necessary to give special consideration to the following:

- (1) Reduction or substitution as a result of aircraft limitations.
- (2) Degree of security within the landing area.
- (3) Time available after landing for assembly and reorganization.
- (4) Extent to which the elements involved in the tactical air movement must be phased back; i.e., priority of movement.

b. Landing Plan.--Sequence, time, method of delivery, and place of arrival of troops and materiel in the objective area is determined.

c. Air Movement Plan.--Aircraft loads, assignment to serials and columns, loading and departure sites, flight routes, and other measures

for movement from the departure area and arrival in the objective area is in accord with the landing plan.

d. Marshalling and Loading Plan.--This plan includes movement to temporary camps and bivouacs in which final preparation is accomplished, movement to the loading sites, and loading into aircraft.

e. Planning Guidance.--Planners must strive for simplicity. The inherent complexity of an air movement operation necessitates uncomplicated plans and maximum tactical integrity in loading units.

#### 81204. PLANNING CONSIDERATIONS

Air movement operations require detailed coordination between the transported units, the supported unit, and the transport aviation unit. All planning is influenced by the mission of the air movement force, the scheme of maneuver, and the availability of aircraft.

a. Scheme of Maneuver.--Special consideration is given to the time and place at which initial and reserve elements are landed, and assembly and reorganization of the initial forces. Attention is given to protection of the air landing facilities upon which additional troops, supplies, and equipment are to be delivered.

b. Aircraft Availability.--Only in exceptional cases will the number of aircraft allocated for the operation be of sufficient quantity to permit their exclusion as a planning consideration. The limitation of aircraft availability will have a significant influence on all phases of planning.

#### 81205. ARTILLERY EMPLOYMENT

Light and medium artillery normally accompany the assault echelon in an air movement operations. Division artillery can be transported by medium or heavy helicopters and by medium or heavy fixed-wing transport aircraft. Field artillery group units are air transportable in heavy transport aircraft.

a. Factors.--Special factors affecting artillery employment in an air movement operation are:

(1) Preassault special and/or conventional munitions bombardment of enemy forces and installations in the objective area.

(2) Capability of artillery units to rig materiel for heavy drop parachute delivery and transport by aircraft.

(3) Required training in air transportation techniques.

(4) Application of rigid security to deny the enemy knowledge of the planned air movement operation.

(5) Inability to conduct ground reconnaissance of positions in the objective area prior to the movement.

(6) Determination of survey data, and target intelligence from outside agencies and sources.

(7) Establishment of communications between the airhead artillery headquarters and the artillery headquarters of linkup or supporting forces.

(8) Early establishment of centralized control.

(9) Availability of aircraft and cargo space to move the artillery units and support them in the objective area.

(10) Need for fire support coordinating and limiting measures.

b. Plans and Estimates.--With the announcement of the planning directive, concurrent and parallel planning is initiated at all echelons. Liaison is established and maintained. The artillery estimate of supportability and estimate of artillery requirements are developed in the same manner as in an amphibious operation. In addition to the elements normally included in an operation order, the order for those units that will remain under the control of the artillery headquarters will include:

(1) Plan for movement to the marshalling area.

(2) Counterintelligence measures in the marshalling area.

(3) Air movement table.

(4) Assembly plan.

(5) Loading plan.

(6) Supply, including ammunition, rations, water, and POL to be taken in organic loads.

(7) Resupply and replacement plans.

c. Selection of Position.--An assembly control point is selected when artillery equipment is to be air delivered/parachuted in the objective area, and to control dispersed landings of artillery elements. Reconnaissance is continuous throughout the planning of the air movement.

d. Communications.--The communication plan must provide for expansion from decentralized to centralized control and for communications with other supporting areas.

e. Loading Plans.--The loading plan includes the aircraft parking diagram obtained from the transport aircraft representative, routes within the marshalling area, order of loading, and the distribution of responsible staff and key personnel throughout various aircraft. Unless the specific number and type of aircraft to be provided are known, several plans must be prepared to anticipate changes in aircraft availability by type and quantity. The loss of one or more aircraft should not materially affect the artillery unit's ability to accomplish its mission if it is properly loaded. Key command and technical personnel are distributed throughout the movement serial.

f. Supply Plans.--Normally, the prescribed load of ammunition, rations, and water transported in the organic tactical load will be established by higher headquarters. Resupply may be air delivered, air landed, or by helicopter on request of the artillery commander or by automatic resupply, based on prior planning.



g. Landing Plans.--(See fig. 57.) A reconnaissance is begun immediately upon landing. Previously selected positions from map reconnaissance are confirmed, the primary direction of fire is determined, and security areas and battery facilities are selected. Positions are selected to give all-round support capability. Guides are posted to expedite the

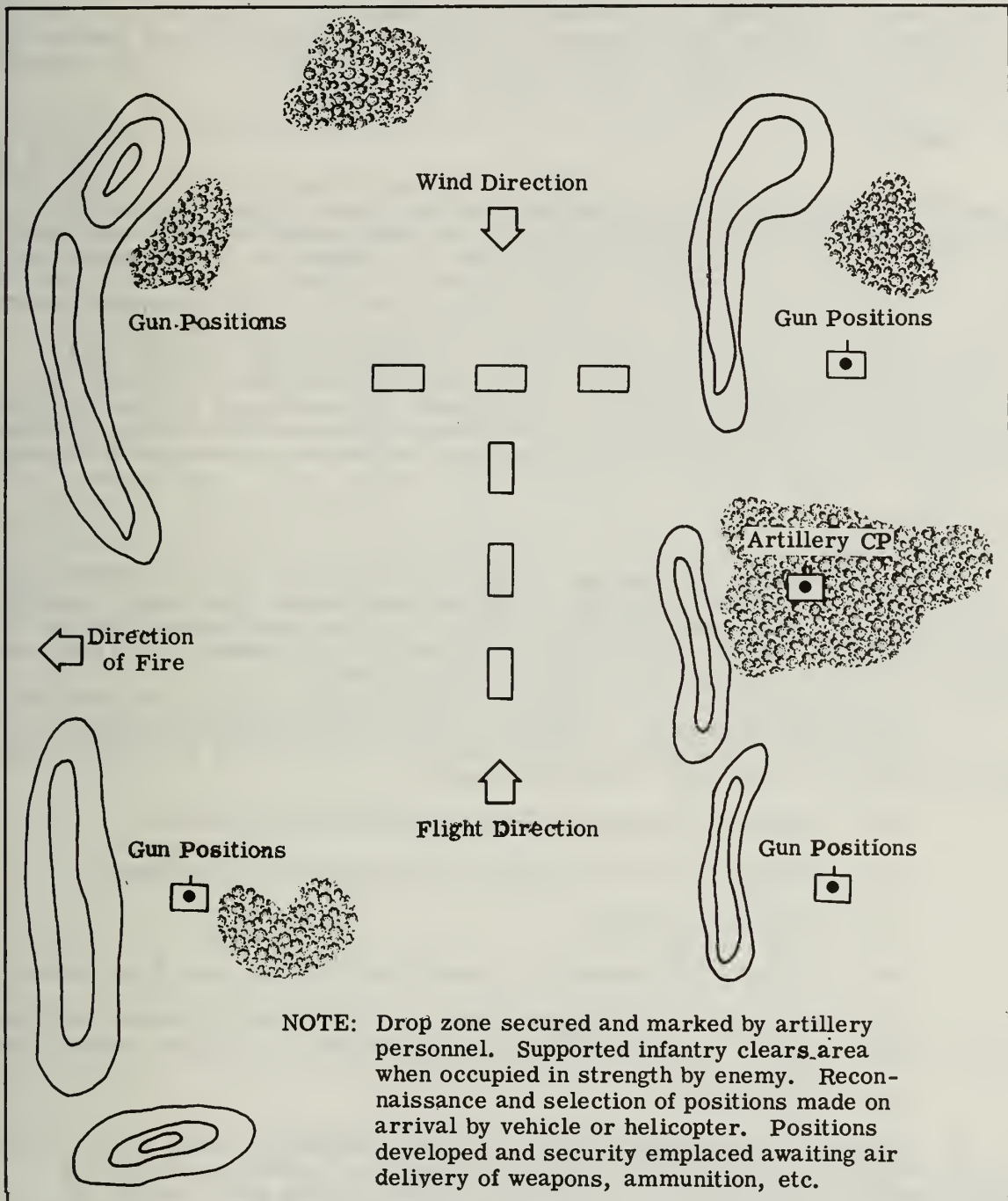


Figure 57.--Drop Zone for Air Delivery of Artillery.

occupation of position. Survey is started and communications are established with the supported unit, forward observer teams, liaison teams, and higher artillery headquarters. The artillery commander works toward establishing early centralized control of the artillery units in the objective area. When equipment is to be parachuted to artillery personnel already on the ground, the artillery unit is responsible for marking and clearing its own drop zones. Equipment is recovered and assembled as rapidly as possible. Sections move to designated assembly points; section chiefs take charge of their equipment and lay their pieces for direct fire until the unit is assembled and ready to perform their indirect fire mission.

#### 81206. TRAINING

Particular attention is given to aircraft loading based on the type of aircraft that has been allocated for the movement. Training should include complete rehearsals, and practice landing areas are selected that resemble the terrain in the objective area. Although it is desirable to drop or air land the artillery in areas already secured by the infantry, the changing situation may require artillery to fight their way to designated assembly or position areas. Training should involve the probability of artillery employment in the infantry role. Decentralized control and establishment of centralized control, using only radio communications, are practiced during training exercises. Movement of artillery pieces by hand, abnormally large sectors of fire, and defense of the artillery position are stressed in the firing battery. NBC defense measures are stressed throughout training.

#### 81207. REHEARSALS

Rehearsals prior to the operation are essential and should be made as realistic as circumstances allow. During rehearsal, artillery elements are integrated and assigned tactical missions in the same manner as the planned operation. In the air movement operation, at least one full-scale rehearsal with the supported unit should be planned.

a. Combined Rehearsals.--Combined artillery-infantry rehearsals may include complete loadings, practice landing, and ground maneuver. They should include, as a minimum, the following:

- (1) Plans and preparation for the entire operation.
- (2) Assembly at the airfield and checking of equipment.
- (3) Simulated loading.
- (4) Simulated dispersion in selected landing and drop zones.
- (5) Operation on assigned radio nets and using prescribed call signs and codes, subject to the security requirements of higher headquarters.
- (6) Critiques.

b. Separate Rehearsal.--The artillery commander makes every effort to obtain sufficient aircraft for the rehearsal in order to execute a practice loading and landings. Units are loaded in the same manner as prescribed in the operation plan except for individuals and small detachments. Personnel are carefully briefed in their loading requirements.

## 81208. ECHELONMENT OF ARTILLERY

The air transported element of an air movement operation is normally organized into three echelons. These echelons are determined by priority of landing, availability of air and surface transportation, and the plan of operation. They are:

- a. Initial Echelon.--Those forces required to accomplish the mission.
- b. Followup Echelon.--In addition to supporting forces not initially required, the remaining vehicles and equipment of the initial echelon are included.
- c. Rear Echelon.--The rear echelon is similar to that of an amphibious operation. It remains in the departure area and performs such functions and tasks as required.

## 81209. AIR DELIVERY

Operations which include air delivery are the joint responsibility of the commanders of the artillery unit, air delivery platoon, and air transport unit. Supplies and equipment may be air landed or dropped by parachute. The artillery commander makes his request, which contains the estimate of equipment, supplies, and other material, through the appropriate headquarters. Drop zones are selected in concord with the supported and supporting units involved. Liaison between units ensures complete coordination. The air delivery platoon is responsible to load, rig, lash, and tie down equipment to be delivered. The artillery commander provides such assistance as is necessary to expedite rigging and loading of his equipment. In large operations, much of the work is performed under the guidance and supervision of an air delivery platoon representative. When requested, air delivery personnel accompany the aircraft to the drop zone and assist in ejecting supplies and equipment from the aircraft. Resupply is prepackaged and delivered automatically, on schedule, or on request of the artillery commander.



## Section XIII. ARTILLERY IN NUCLEAR ENGAGEMENTS

## 81301. GENERAL

a. Progress in the development of nuclear weapons and their associated delivery systems has made powerful weapons available to commanders from MAF down to regimental level. Future changes or continued technological progress may make them available at even lower levels. Consequently, commanders and staffs at all levels must have an understanding of nuclear weapons and their effects in order to employ them effectively.

b. When the use of nuclear weapons is imminent, artillery must be capable of redeploying as soon as practicable. Limited maneuver only may be possible during the initial nuclear exchange. Therefore, the considerations of artillery dispositions during conventional war must be such that the artillery will be able to accomplish its mission with minimum displacement if called upon to render nuclear support.

c. The battle for nuclear superiority will be won through the combined effort of all U.S. forces. This section discusses the role of the artillery in this combined effort and to certain considerations in the employment of nuclear weapons.

## 81302. ROLE OF ARTILLERY

a. Nuclear Superiority.--The principal artillery task in nuclear combat is to gain fire superiority as rapidly as possible over the enemy's nuclear artillery throughout the area of influence of the supported force commander. Concurrently with this task, the artillery will provide continuous support to the maneuver elements, delivering either nuclear or non-nuclear fires as required.

b. Acquiring Nuclear Targets.--All available target acquisition means will be exploited in locating nuclear targets. At division and MAF, these means will include ground and aerial observers, electronic and mechanical means, and reconnaissance and intelligence-gathering agencies such as patrols and stay-behind elements. The location of hostile nuclear artillery is of primary concern.

c. Deployment

(1) Although centralized control is desirable, distances and deployments may dictate decentralization. When decentralization is necessary, artillery may be attached to maneuver units.

(2) Units not used to deliver nuclear fires should be disposed in depth:

(a) To support maneuver elements in action against enemy penetration or infiltration.

(b) As a passive measure against nuclear attack.

(c) To provide for artillery unit replacement.



(d) To support maneuver elements in subsequent phases of the operation.

#### 81303. FIELD ARTILLERY GROUP

a. The ranges of certain nuclear artillery weapons and their employment over extended distances may dictate attachment of field artillery group units to the field artillery units to division.

b. Shorter range nuclear artillery units will require firing positions relatively near the FEBA. In addition, these units will require assembly areas and firing positions deeper in the zone. Nuclear artillery units in the forward area should be so positioned as not to present lucrative target complexes to the enemy.

c. Some nonnuclear artillery units will be positioned in depth for the purpose stated in subparagraph 81302c(2) and may be out of range of the FEBA. These units will be positioned to support maneuver forces deployed at relatively great depths.

#### 81304. ARTILLERY REGIMENT

The general considerations outlined for field artillery group units apply equally to the artillery regiment. Additional considerations concerning employment of the artillery regiment in nuclear combat are:

a. Direct Support Battalions.--Artillery battalions in direct support may be attached to major combat elements. Their position areas will be determined by the deployment and mission of the supported force.

b. Other Artillery.--Regimental artillery units not assigned a mission of direct support are employed by the division commander in a manner to ensure maximum participation in the nuclear battle consistent with the capabilities of the weapons. In general, nuclear units will be employed throughout the depth of the zone.

#### 81305. INFANTRY REGIMENT

In a fluid operation, time is of the essence in the target-acquisition-mission processing-weapon delivery cycle. The nature of the targets and the range and speed of the acquisition and delivery means call for decentralized firing authority and streamlined processing procedures. Figure 58 shows the regimental processing phases for special ammunition. This is contingent on the assessment as well as allocation of weapons to the regiment.

a. Target Acquisition Capability.--Before nuclear fires can be planned, suitable targets must be acquired. An analysis of one example, a typical target array of an aggressor motorized rifle division, showed that 80 percent of the targets were within the regimental zone of action and that 20 percent were beyond the regimental zone of action but within the division zone of action. Of all targets within the division zone of action, 30 to 50 percent can normally be acquired in a 24-hour period.

b. Types of Targets and Threat.--Targets considered suitable for nuclear attack at regimental level are those targets that post a distinct threat to the regiment's mission. The regiment is concerned primarily with enemy nuclear delivery units and troop units of company size or larger.

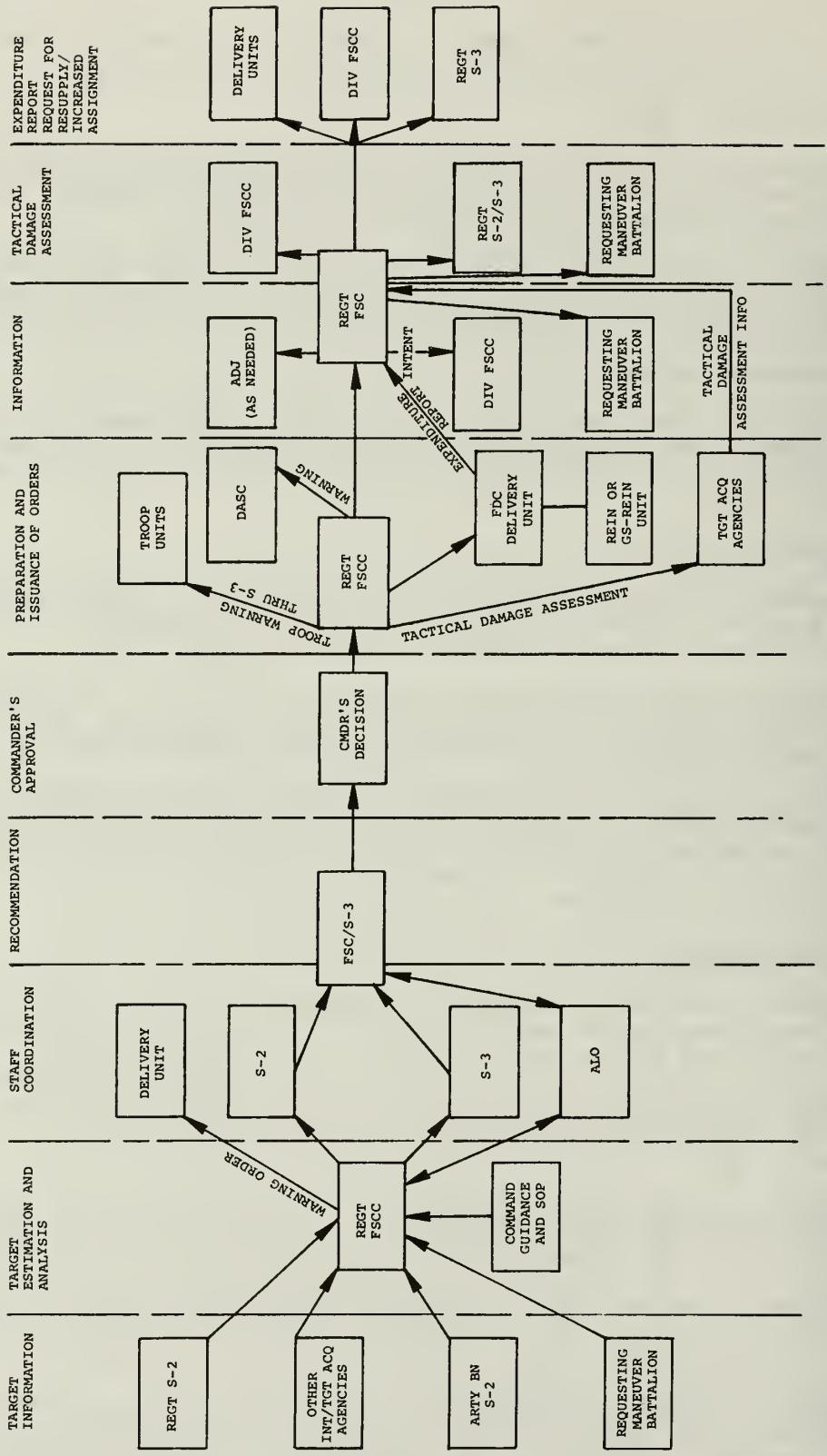
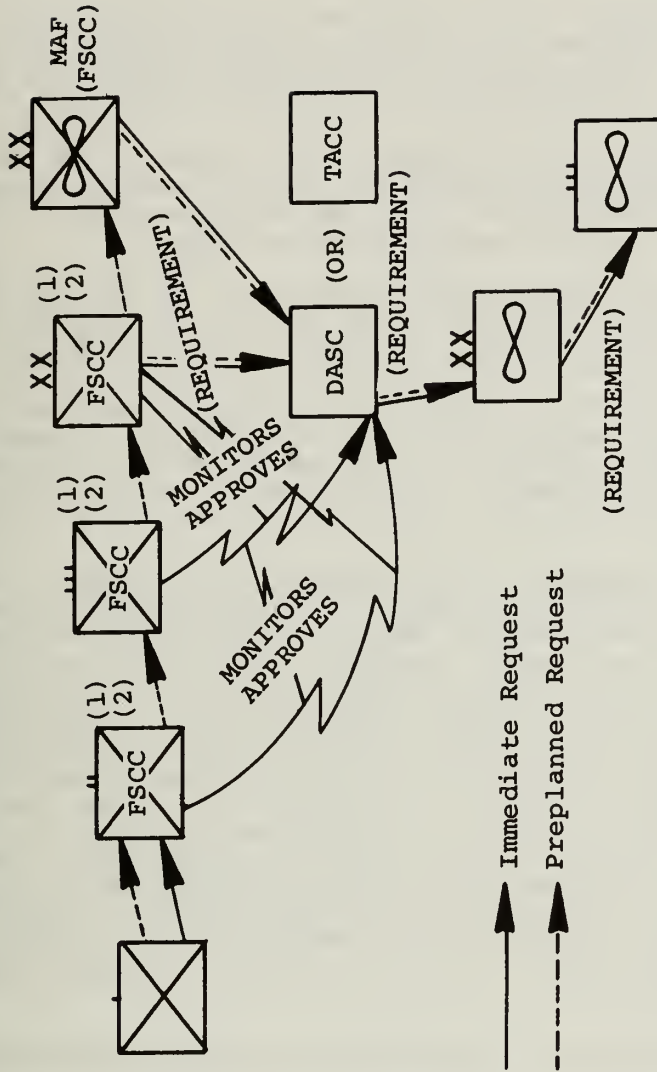


Figure 58.--Regimental Brigade Special Ammunition Processing Phases.



1. Assumes commander has been assigned on an air delivered weapon. Requests must be processed through successive maneuver channels until they reach the commander who has been assigned the weapon requested.

2. Analyzes target, gains commander's approval, issues intent and warnings, passes requirement to DASC/TACC for aircraft and S-2/G-2 for tactical damage assessment.

Figure 59.--Request Channels for Air-Delivered Special Ammunition.

Smaller units normally are not of sufficient importance to the regiment to warrant the expenditure of a nuclear weapon. The regimental commander must assign priorities to targets.

c. Target Stay Time.--The stay time of dismounted enemy company and battalion size units is short. The stay time of mechanized and armored units is even shorter. Consequently, rapid target acquisition and identification, target analysis, and delivery of fire are essential.

d. Response Time of the Delivery Means.--Because of the mobility and short stay time of targets suitable for nuclear attack at regimental level, quick response is imperative. The use of appropriate tactical missions and fire request channels reduces response time.

e. Target/Weapon Compatibility.--The radii of effects of low-yield and very low-yield nuclear weapons are such that these weapons are ideally suited for employment against company and battalion size units.

f. Troop Safety.--The minimum safe distances (MSD) of low-yield and very low-yield nuclear weapons are such that, in most cases, the only friendly units that will be affected are those units under regimental control or in support of the regiment. The exceptions are all friendly aircraft, which can be warned through communications available to the regiment.

g. Analysis, Processing, and Coordination Procedures.--Because of time limitations and the absence of details on the composition and precise internal disposition of most targets, target analysis may be conducted by use of the visual method and precut template. Attention must be given to troop safety, and a quick determination must be made of the effects of chemical downwind hazard and of induced contamination, tree blowdown, and fallout (in the event of an inadvertent surface burst) on maneuver elements. The analysis is performed in the FSCC by the fire support coordinator, who is a trained target analyst. When the decision to fire has been made by the regimental commander, the mission is processed through artillery fire control channels to the delivery unit capable of responding. The notification of intent to fire is transmitted to the division combat operations center (COC) through either operational or fire support coordination communication channels and to adjacent units through lateral communication or by relay from the division combat operations center. Request channels are shown in figures 58 and 59.

#### 81306. EMPLOYMENT OF ARTILLERY SUBSEQUENT TO NUCLEAR ENGAGEMENTS

a. Following a nuclear engagement, the artillery supports the maneuver elements with nonnuclear fires as required. The artillery continues to maintain nuclear superiority over enemy nuclear artillery throughout the area of influence of the supported force commander.

b. The battle for nuclear superiority may result in extensive losses in artillery personnel and equipment. In order to provide artillery support under these adverse conditions, artillery commanders must be prepared to:

(1) Decentralize control to the degree dictated by the situation.

(2) Operate with limited logistic support.



- (3) Improvise command and administrative structures.
- (4) Replace or reconstitute ineffective units.

## Section XIV. ARTILLERY IN CHEMICAL OPERATIONS

## 81401. COMMANDER'S GUIDANCE FOR EMPLOYMENT OF TOXIC CHEMICAL WEAPONS

The commander's basic guidance for the employment of toxic chemical weapons should be included in the unit's SOP. The guidance should provide information similar to that contained in the commander's guidance for employment of nuclear weapons.

## 81402. BASIS OF EMPLOYMENT

a. Determination of the level at which toxic chemical weapons will be employed is based on the factors given in paragraph 81303 for nuclear weapons.

b. Toxic chemical agents may be employed to assist the commander in accomplishing his mission. Plans for the employment of these agents to support tactical operations are integrated with the scheme of maneuver. In the fire support plan, toxic chemical fires may be integrated with other planned fires, or may appear in a separate chemical fire support plan.

c. Toxic chemical weapons are effective against personnel protected from blast and fragmentation effects of other weapons.

d. In considering the distribution of chemical fires within the battle area, the commander and his staff are concerned with chemical contamination. The area of the residual chemical contamination is relatively small. The contamination is usually limited to the target area. The hazard may vary from nuisance effects to varying degrees of casualty-producing effects. Troop safety will depend on the protective posture assumed by the friendly forces.

e. In defensive operations, toxic chemical agents may be employed to produce casualties, blow down or canalize the enemy attack along avenues of approach favorable to the defender, and force the enemy into dispositions that facilitate friendly counterattack. Extreme care must be exercised in the use of toxic chemical agents to avoid creating hazards to friendly troops.

f. Details concerning the employment of artillery toxic chemical operations are given in the FMFM 11-3 series of manuals.

## 81403. COORDINATION

When militarily-significant toxic chemical weapons effects are predicted to extend beyond a regimental zone of action, coordination with the adjacent commander is required.

## 81404. CAPABILITIES

Artillery is capable of delivering toxic chemical agents on hostile targets. Toxic chemical agents provide the commander with a means of target neutralization which may be used alone or in conjunction with other fires. The capabilities of the delivery systems and the characteristics of the agents must be considered in determining the most suitable weapon system

for attack. Nonpersistent agents should be delivered as surprise fire to achieve maximum results; persistent agents can be placed on the target over a period of time. To gain the full value of the element of surprise, artillery uses the time-on-target (TOT) technique in delivering nonpersistent agents.

## Section XV. PSYCHOLOGICAL OPERATIONS

## 81501. GENERAL

Artillery participation in psychological operations is generally limited to the task of dissemination of propaganda by leaflets on selected enemy positions and enemy controlled areas. At the tactical level, the FSCC coordinates psychological operations missions. Consideration is given to the effects of the weather, terrain characteristics, and situation in order to determine the target or target area and time of delivery to best accomplish the desired effect. The location of and range to the propaganda target area will normally determine the delivery system selected. The conduct of psychological operations is shared by the intelligence and the operations sections of the headquarters involved.

## 81502. MISSIONS FOR ARTILLERY

Missions for dissemination of leaflets are received by directive from higher headquarters. These missions are directed to the landing force psychological operations officer; when approved, they are sent to the FSCC of the landing force or division as appropriate. The firing unit obtains propaganda shells from the ammunition supply point; however, in an urgent situation, the shells are delivered to the firing batteries directly. The unit firing should receive copies of the leaflets to be fired to ensure interest in the mission and emphasize the importance of their performance. Ill-timed or incorrect firing of propaganda shells can have a long-lasting effect and even be counterproductive.

## 81503. FIRING OF PROPAGANDA SHELLS

Normally, the best time for firing of propaganda projectiles is near dusk or during the morning hours to enable the enemy soldiers or civilians to obtain the leaflets under the cover of darkness. Rainy weather will not delay firing the propaganda mission, since most propaganda leaflets lose very little of their legibility when wet. The best terrain for leaflet coverage is usually flat, wooded country. Targets in mountains are difficult to reach, and in open country, the leaflets blow along the ground from point of impact and may pass out of reach of the target personnel. The factor which governs the accurate distribution of leaflets over a given area is not only accurate firing data, but a consideration of the target area wind velocity and direction. The ballistic change between the standard smoke shell and a smoke shell with leaflets results in a maximum difference in range of approximately 200 meters. (See FM 6-40, Field Artillery Cannon Gunnery, and FM 33-5, Psychological Operations--Techniques and Procedures.)



## Section XVI. SMOKE EMPLOYMENT OPERATIONS

## 81601. GENERAL

Smoke generally is not equated to combat power because it is not lethal. Nevertheless, when used correctly, it can significantly reduce the enemy's effectiveness both in the daytime and at night. Smoke, combined with other suppressive fires, will provide increased opportunities for maneuver forces to deploy, thus enhancing the changes of mission accomplishment without catastrophic losses while operating on the highly lethal modern battlefield. Smoke attenuates laser beams and inhibits the use of optically-guided missiles, such as the SAGGER. Smoke may be used to reduce the ability of the enemy to deliver effective fires, to hamper hostile operations, and to deny the enemy information on friendly positions and maneuver. The effective delivery of smoke by the field artillery at the critical time and place on the battlefield will contribute significantly to the effectiveness of the combined arms team.

## 81602. EMPLOYMENT OF FIELD ARTILLERY SMOKE

a. Obscure Enemy Vision.--Use smoke to:

- (1) Defeat flash ranging; restrict the enemy's counterfire program.
- (2) Obscure artillery observation posts (OP's); reduce the accuracy of enemy observed fires.
- (3) Obscure enemy direct fire weapons to include wire-guided missiles to reduce their effectiveness up to 90 percent.
- (4) Obscure enemy lasers to reduce their effectiveness.
- (5) Instill apprehension; increase enemy patrolling.
- (6) Slow enemy vehicles to blackout speeds.
- (7) Increase command and control problems; prevent effective visual signals and increase radio traffic.
- (8) Defeat night observation devices and reduce the capability of most infrared (IR) devices.

b. Screen Maneuver Elements.--Use smoke to screen:

- (1) Unit maneuvers.
  - (a) Smoke draws fire. Ensure that screens are large enough so that random enemy fire will not cause excessive casualties.
  - (b) Deceptive screens cause the enemy to disperse his fires and expend his ammunition.
- (2) Flanks. Smoke may be used to screen exposed flanks.

(3) Areas forward of the objective. Smoke assists the maneuver units in consolidating on the objective.

(4) River-crossing operations. Screening the primary crossing site denies the enemy information, and deceptive screens deceive the enemy as to the exact location of the main crossing.

Delivery System	Type Round	Nomenclature	Time to Build Effective Smoke	Burning Time
155mm	WP	M110B2	$\frac{1}{2}$ Minute	1-1 $\frac{1}{2}$ Minutes
	HC	M116B1	1-1 $\frac{1}{2}$ Minutes	4 Minutes
105mm	WP	M60A1	$\frac{1}{2}$ Minute	1-1 $\frac{1}{2}$ Minutes
	HC	M84B1	1-1 $\frac{1}{2}$ Minutes	3 Minutes

Figure 60.--Artillery Smoke Ammunition.

#### 81603. SMOKE AMMUNITION AND DELIVERY MEANS AVAILABLE

a. Field Artillery.--Field artillery smoke ammunition (see fig. 60) consists of two types with different burning characteristics:

- (1) White phosphorus (WP).
- (2) Hexachloroethane (HC).

b. Mortars.--Mortars can provide good initial smoke coverage with WP ammunition because of their high rates of fire.

c. Tanks.--Tanks firing from overwatch positions can suppress anti-tank guided missile gunners at 1,500-3,000 meters with WP ammunition. The basic load for tanks includes some WP ammunition.

#### 81604. EMPLOYMENT CONSIDERATIONS

a. Weather.--The forward observer (FO) is the normal source of wind and smoke condition data for the target area; he determines the data based on what he sees and feels. Atmospheric stability, wind direction, and wind speed are the major factors influencing the effectiveness of smoke.

(1) Atmospheric Stability.--The weather conditions, the time of day, and the wind speed all affect atmospheric stability. The atmospheric stability is categorized into three temperature gradients--inversion (stable), neutral, and lapse (unstable). The temperature gradient is an expression of the difference in air temperature from  $\frac{1}{2}$  meter to 4 meters above the ground. Vertical variations in temperature affect air stability, which in turn affects the formation of vertical air currents.

(2) Wind Direction and Speed.--The movement of smoke depends on the speed and direction of the wind.

(a) Wind speeds ranging from 4 to 14 knots are best for the production of smokescreens. Optimum speeds vary with the type of smoke used.

(b) Wind direction influences the desired location of smoke in the impact area.

(3) Other Considerations

(a) Temperature.--A rise in temperature may increase the rate of evaporation, causing the smokescreen to dissipate more rapidly.

(b) Humidity and Precipitation.--Humidity and precipitation may enhance the effectiveness of smoke.

b. Ammunition.--The amount of smoke ammunition in basic loads is limited. Expenditures of smoke ammunition vary considerably with each specific mission. All users, especially the FO, fire direction officer (FDO), and fire support coordinator (FSC), must know the amount of ammunition available and how much smoke it will provide. Large requirements for smoke may require redistribution of the basic loads of several units or issue of additional smoke ammunition for a specific operation. Combat experience has shown that smoke ammunition will not be available to support all smoke requests.

c. Available Means.--Prior to firing a smoke mission, the FO, FDO, and FSC must consider the means available. The FO recommends to the maneuver commander whether mortars or artillery should fire. The FDO decides which artillery weapons will fire or whether to have a reinforcing unit, if available, support the mission. The FSC provides tactical information which could affect the fire support available.

d. Delivery Techniques.--Using different amounts of smoke on the battlefield against targets of various sizes requires different gunnery techniques. The use of different delivery techniques does not preclude the use of smoke on other occasions or for different objectives.

e. Command and Control.--The maneuver commander for whom the smoke is planned must approve its employment. When he issues his plans and concepts for an operation, he should state the guidelines on the amount of smoke that can be used, along with any restriction on its use. To ensure that smoke is responsive, the FO and FSC must request this smoke planning guidance if it has not been stated.

(1) The maneuver commander responsible for the operation must coordinate smoke operations with all units participating in or potentially affected by the operation.

(2) The operations officer (S3/G3) is responsible for the integration of smoke into the plan of maneuver.

(3) The maneuver commander must be advised on the availability of munitions and delivery systems.

(4) Combat arms troops must be well trained in smoke operations and comprehensive SOP's must be available and known to all. This will shorten reaction time.

81605. FORWARD OBSERVER TACTICAL CONSIDERATIONS

a. Be in a position to observe.

(1) If smoked by the enemy:

(a) Move to higher ground.

(b) Move upwind.

(2) Use battlefield illumination or night vision devices when employing smoke at night.

b. Know the terrain. The terrain affects the employment of smoke.

(1) Smoke tanks in defile; they lose their sense of direction.

(2) Smoke seeks low spots.

(3) Firing smoke on dry vegetation may start fires.

(4) Do not fire smoke on deep mud, water, or snow; the smoke round normally will not function properly.

(5) Do not fire HC on steep slopes; canisters roll downhill.

c. Be flexible.

(1) Smoke does not always have to be placed on or in front of the enemy's frontline elements to be effective. Smoke can be placed behind these elements to silhouette them or to obscure the enemy's vision from overwatch positions.

(2) Firing of smoke by an aerial observer may be more difficult since he may not always be in a position to adequately determine the smoke conditions or to ensure that the smoke is effective.

(3) Be ready to make changes if the smoke begins to hamper maneuver elements.

d. Know the artillery's smoke capability. You should know:

(1) The amount of smoke ammunition available.

(2) The approximate number of rounds required for a battery to provide a smokescreen of a given size with various wind speeds, wind directions, and atmospheric conditions.

e. Know and anticipate the enemy.

(1) Fire smoke on enemy artillery OP's/FDC's to greatly reduce the effectiveness of his artillery.



(2) Fire smoke and HE on the enemy when he deploys from column to line formation. The HE will keep him buttoned up. The smoke will cause maximum confusion.

(3) Fire smoke and HE on minefields to cause maximum confusion. The enemy will not know what he is being hit with.

f. Understand the effects of smoke on effectiveness. Smoke used without sufficient thought and planning will reduce effectiveness more than that of the enemy.

g. Compensate for reduced effectiveness of smoke. A gap in the smokescreen can develop as a result of a faulty sheaf or faulty ammunition.

#### 81606. COUNTERFIRE

Counterfire will be initiated either in response to a request for immediate counterfire or against lucrative/fleeting counterfire targets of opportunity. Planned counterfire programs will be initiated to suppress the enemy's artillery at the critical time and place. The forward observer plays an important role in counterfire both as a source of target information and the initiator of requests for immediate counterfire in support of his maneuver force.

a. Counterfire Target Information.--As one of the eyes of the artillery, the observer must forward the following information (whenever observed) to his FDC or FSCC as expeditiously as possible. Local SOP's will specify who should be called and what actions should be taken by the person receiving the request.

(1) Locations of enemy indirect fire weapons and command observation posts (COP).

(2) Counterfire damage assessments.

#### b. Immediate Counterfire

(1) Any unit receiving incoming artillery, mortar, or rocket fire can request immediate counterfire from the field artillery. Requests should include:

(a) Identification.

(b) Warning order.

(c) Type of fire.

(d) Direction or source of fire.

(e) Severity of fire.

(f) Area shelled (grid).

(2) Maneuver and artillery units request counterfire through normal fire support/fire direction channels. Requests for immediate counterfire can be transmitted in clear text; however, the coordinates of the area shelled should be encoded to prevent the enemy from determining the effectiveness of his fires.



## APPENDIX A

## SAMPLE ARTILLERY ESTIMATE OF SUPPORTABILITY

## CLASSIFICATION

1st Marine Division (Rein)  
CAMP PENDLETON, CA.  
151200Z Feb 19\_\_

## ARTILLERY ESTIMATE OF SUPPORTABILITY

Ref: (a) Map: ASAR PENINSULA, 1:50,000, AMS Series Z112, Sheet 1211I, 1212I  
(b) CTF 76 Concept of Operation, 141600 Dec 19\_\_

## 1. MISSION

The landing force will land by helicopter and surface means on the Asar Peninsula, destroy surface communications with the mainland, seize and defend the port and air facilities on the Asar Peninsula.

a. Artillery Concept.--Land on order by helicopter and surface means on the Asar Peninsula, support the attack of the landing force, and by fire, assist in destroying enemy communications with the mainland.

b. Previous Decisions

(1) Waterborne landing sites 89 with RED and WHITE beaches, 90 with BLUE beach, and 91 with GREEN beach are suitable for landing artillery.

(2) Helicopterborne landing zones will be in the Asar Peninsula neck area (391623).

(3) Nuclear and chemical munitions will not be employed without authority of Commander, U.S. Seventh Fleet.

(4) Air attacks against the enemy troops' bases, facilities, and installations will be conducted prior to D-day.

c. Purpose of the Estimate. (Not required)

## 2. SITUATION AND CONSIDERATIONS

a. Characteristics of the Area of Operations.--See Intelligence Estimate.

b. Enemy Capabilities and Most Probable Course of Action.--See Intelligence Estimate.

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c. Friendly Forces

(1) Own Forces.--See Planning Guidance, Forces Available.

(2) Courses of Action

- (a) C/A #1.--Land by helicopter with one RLT, seize and defend the neck of Asar Peninsula, destroy communications with the mainland; land by surface means with two RLT's, seize Port Keea; effect linkup with helicopterborne forces; subsequently, continue attack and seize Asar City and remainder of Asar Peninsula.
- (b) C/A #2.--Land by helicopter with one RLT, seize and defend the neck of Asar Peninsula, destroy communications with the mainland; land by surface means with one RLT, seize Asar City, and with another RLT land by surface means and seize Port Keea; effect linkup with helicopterborne forces; subsequently, continue attack, seize remainder of Asar Peninsula.
- (c) C/A #3.--Land by helicopter with one RLT, seize and defend the neck of Asar Peninsula, destroy communications with the mainland; land by surface means with one RLT, seize Port Keea; effect linkup with helicopterborne forces; subsequently, land by surface means with one RLT, seize Asar City, continue attack to seize remainder of Asar Peninsula.

d. Assumptions

- (1) The enemy will not significantly reinforce the Asar Peninsula prior to our landing.
- (2) The artillery must possess a ground delivery nuclear capability.
- (3) In all three courses of action, the air and naval gunfire support capabilities will equally affect the artillery support requirements.

## 3. ARTILLERY ANALYSIS

a. Considerations Having Equal Effect

- (1) The forecasted weather and hydrographic conditions.
- (2) All landing beaches, with the exception of BLUE beach, provide limited egress inland.
- (3) Poor ground observation in the Asar City area, thus intensive aerial observation will be required for this area.

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- (4) Artillery requirements will remain the same for the helicopterborne RLT.
- (5) Terrain in the Asar Peninsula neck area favors maneuver by the artillery and provides defiladed artillery position areas.

b. Courses of Action

- (1) C/A #1.--This course of action provides for equal pressure on all the enemy defenses in the Asar Peninsula. It will provide for rapid movement inland, thereby uncovering firing positions and permitting an early landing of supporting artillery and optimum firepower to support the infantry units. This course permits the majority of the artillery to be retained under centralized control, thus ensuring a rapid massing of fires where and when most needed.
- (2) C/A #2.--This course of action requires initial landings against the major enemy defensive installations. Thus, it will require considerable fire support. Initial position areas in required quantity will probably not be available early. Poor ground observation in the Asar City area dictates that aerial observation requirements will be heavy from the commencement of the assault. Fire support coordination and command communications will be difficult due to separation of landing sites and intervening terrain.
- (3) C/A #3.--See Analysis C/A #1 and C/A #2. In addition, this course of action will provide the enemy additional time to intensify his defensive effort in the Asar City area. In any event, artillery support for the Port Kea area would either have to be retained in reserve aboard ship or reembarked over the beaches. This course of action provides for only limited artillery to be committed early in support of actions ashore.

## 4. EVALUATION

a. C/A #1(1) Advantages

- (a) Initial surface landing avoids main enemy strength.
- (b) Permits more rapid movement inland thereby providing for uncovering of any artillery position areas.
- (c) Provides for earliest reinforcements of the fires of the artillery with the helicopterborne RLT.
- (d) Provides for some initial mutual support by artillery units throughout the landing force zone.

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- (e) Facilitates radio communications within and between artillery units.
- (f) Terrain in the area favors maneuver by the artillery.
- (g) Terrain provides defiladed artillery position areas.
- (h) Provides early and readily available heavy caliber artillery for attack on built-up areas of Port Kea and Asar City.

(2) Disadvantages

- (a) Initially, suitable artillery position areas in the beach areas will be limited.
- (b) Some initial position areas may be visible to enemy observations.
- (c) Initially, artillery units will be concentrated thereby increasing their vulnerability to enemy reaction.

b. C/A #2

- (1) Advantages.--The earlier establishment of widely separated landing areas permits the artillery to be deployed in a more dispersed manner.

(2) Disadvantages

- (a) Initial landings are made against the main enemy defensive installations.
- (b) Precludes mutual support by all artillery units; therefore, more artillery will be required.
- (c) Enemy defenses in the Asar City area dictate artillery support in this area must be heavily weighted.
- (d) The poor ground observation in the Asar City area will require extensive aerial observation early in the assault phase.
- (e) Terrain in the Port Kea area will increase the number of landing means required for the landing of artillery.
- (f) Communications between major artillery units will be difficult due to distance between units and intervening terrain.
- (g) Initial ammunition resupply will be relatively more difficult due to widely separated landing beaches and poor inland egress from RED and WHITE beaches.

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- (h) Fire support coordination will be difficult due to separation of landing areas and intervening terrain.
- (i) Facilitates enemy concentration of firepower against artillery with the landing force.

c. C/A #3(1) Advantages

- (a) Initial surface landing avoids main enemy strength.
- (b) Initially, less artillery support required.
- (c) Provides for reinforcement of the fires of the artillery supporting the helicopterborne RLT.
- (d) Provides some initial mutual support by artillery units in the Port Kea area.
- (e) Provides some heavy caliber artillery fires, early, for attack on built-up areas of Asar City.

(2) Disadvantages

- (a) Provides the enemy more time to improve his major defensive installations.
- (b) Artillery support for the Asar City area must be heavily weighted.
- (c) Enemy will be able to best concentrate his counterfire efforts against our artillery.
- (d) Artillery support for the Asar City area must be held in reserve aboard ship or reembarked over the beaches.
- (e) Restricted number of landings will limit the amount of artillery support that can be landed initially.
- (f) Poor ground observation in the Asar City area will require extensive aerial observation effort when landing is made in that area.
- (g) Artillery support, when committed in the Asar City area, initially cannot be reinforced by artillery from the Port Kea area.
- (h) Ammunition resupply for the Asar Peninsula neck area, initially, will be difficult due to the limited egress from RED and WHITE beaches.

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- (i) Communications between major artillery units will be difficult due to distance between units and intervening terrain.
- 'j) Fire support coordination, once forces have been committed to the Asar City area, will be difficult due to distance and intervening terrain.

## 5. CONCLUSIONS

All courses of action can be supported by the artillery.

- a. Best Course.--C/A #1 can be supported best. It facilitates the early landing of all calibers of artillery. It provides for the employment of the preponderance of the artillery under centralized control. It will not require reduction, at a critical time, of artillery support for operations in the Asar Peninsula neck in order to adequately support the attack on Asar City.
- b. Other Courses.--Other courses of action listed in order of supportability and their principal disadvantages are as follows:
  - (1) C/A #3.--This C/A will require more artillery than C/A #1. Artillery support for the Asar City area landing must either be held in reserve aboard ship or reembarked over the beaches in time to land with the assault in that area.
  - (2) C/A #2.--This C/A will require more artillery than C/A #1 and C/A #3. The requirement to support two simultaneous and widely separated surface landings and a helicopterborne landing limits the commander's ability to quickly mass all his available firepower on any critical point.
- c. Significant Problems.--There are no significant artillery problems or limitations requiring special consideration.

(Signature)

A. J. JONES  
Colonel, U.S. Marine Corps  
Commanding

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## APPENDIX B

## SAMPLE ESTIMATE OF ARTILLERY REQUIREMENTS

## CLASSIFICATION

10th Marines (Rein)  
2d Marine Division (Rein)  
CAMP LEJEUNE, N.C.  
161400R March 19\_\_

## ESTIMATE OF ARTILLERY REQUIREMENTS

Ref: (a) Maps: AMS PATCH 1:100,000, Sheets I, II, IV, V

## 1. MISSION OF THE LANDING FORCE

- a. Landing Force Mission.--I MAF, composed of the 2d and 3d Marine Divisions (Rein) and the 1st and 2d Marine Aircraft Wings conducts an amphibious operation to seize control of the PATCH ASAR area for the development of a base of operations on the ASAR Peninsula.
- b. Division Mission.--2d Marine Division (Rein) commencing at H-hour on D-day conducts a surface assault over KIMBROL beaches in zone; commencing at G-hour on D-day conducts helicopterborne assault of GUANTO HILL mass, and airfields in GOTA-GOTA area on order.
- c. Effect of Mission on Artillery Requirements.--Artillery support, for a reinforced division operation over a relatively large land mass against an enemy force, requires in excess of one artillery regiment. Additional artillery is also required because some of the assault forces will be operating beyond the effective supporting range of naval gunfire support ships.
- d. Deductions.--The approximate amount of artillery required will be the organic division artillery plus two additional battalions (equivalent). This additional artillery should include some long-range artillery units.
  - (1) Artillery with a nuclear capability should be attached to the division.
  - (2) Additional artillery requirements exist for base defense but are not included in this estimate.

## 2. SCHEME OF MANEUVER

- a. Scheme of Maneuver.--2d Marine Division (Rein) lands RLT-6 and RLT-2 over BLUE and BROWN beaches and seizes designated objectives; at L-hour lands BLT 3/8 by helicopter on GUANTO HILL mass. RLT-6, after seizing designated objectives, effects contact with BLT 3/8.

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Two BLT's from RLT-8 comprise the division reserve. A minimum preparation of objectives, helicopter landing zones, and known enemy concentration areas and installations will be conducted on D-day prior to H-hour.

- (1) The landing of two RLT's over widely separated beaches and the helicopter landing of one BLT reduce the capability of artillery units to mass their fires throughout the division zone.
- (2) There will be a reduced capability of direct support ships due to terrain and range limitations.
- (3) The ranges of the 175mm guns and 8-inch howitzers provide capability to support the division as a whole from position areas in the vicinity of BLUE beach. Intervening masks will limit range capabilities in certain areas.

b. Effect of Scheme of Maneuver on Artillery Requirements

- (1) The artillery battalions in direct support of RLT-6 and RLT-2 will not be able to cover the regimental zones of action within their on-carriage traverse limits. Massing the fires of these units will require them to shift to contingent zones.
- (2) To cover the entire zone of the 2d Marine Division, the artillery units in general support must deploy their subordinate elements. Massing of general support fires will require shifting to contingent zones.

3. ENEMY SITUATION

a. See Intelligence Estimate.

b. Effect of Enemy Forces on Artillery Requirements.--The strength, armament, disposition, and doctrines of the enemy forces in the objective area have been considered in conjunction with the division scheme of maneuver and the requirement that the operation be concluded with all possible speed. These considerations indicate the need for additional artillery and ammunition for the following purposes:

- (1) To gain superiority over hostile artillery and to destroy it early in the operation.
- (2) To repel and destroy any coordinated tank-infantry attack.
- (3) To lower the enemy's combat efficiency and mobility by continual heavy neutralization, harassing, and interdiction fires.
- (4) To seek out and destroy the enemy's facilities for ground delivery of nuclear fires.

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- (5) To deny the enemy observation of our attack troops.
- (6) To destroy fortifications confronting our advancing infantry.
- (7) To provide the necessary close supporting fires for our maneuver units dispersed after landing over widely separated beaches. Since the general pattern of enemy defenses has not been determined, complete artillery coverage is required throughout the division zone. It is not possible to determine which RLT will require more or less support than another. Consideration must be given to having sufficient artillery available in the event the enemy regiment at SERVA is given a counterattack mission. Both assault RLT's will require approximately the same amount of artillery support.

c. Deductions.--Based on the mission, scheme of maneuver, and the enemy situation, the following requirements for artillery, ammunition, and special equipment are established at this time:

(1) Artillery

1 Artillery Regiment.....10th Marines  
 1 8-inch Howitzer Battery (SP)  
 2 175mm Gun Batteries (SP)  
 2 155mm Howitzer Batteries (SP)  
 1 Headquarters Battery, Field Artillery Group (FAG)

The 2d Marine Division (Rein) must attack an enemy of regimental strength (reinforced), and must land over widely separated beaches. This, coupled with the enemy's capability of reinforcing the units now in the division's zone of action with any or all elements of a rifle division, dictates that the division will need additional firepower.

The preponderance of general support artillery fires can be provided by the two 155mm howitzer batteries, two 175mm gun batteries, and one 8-inch howitzer battery under the FAG. This will provide adequate general support coverage of the entire division and these batteries will ensure adequate counterbattery fires against the enemy artillery.

The field artillery group headquarters will control all force artillery batteries.

- (2) Ammunition.--Basic allowances of all artillery ammunition will be carried ashore except as modified herein.

Division 155mm howitzer batteries carry 50 percent additional illumination.

Nuclear projectiles to be allocated.

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## 4. CHARACTERISTICS OF THE AREA OF OPERATIONS

- a. See Intelligence Estimate.
- b. Effect of Hydrography, Terrain, and Weather on Artillery Requirements.--Landing the artillery over the KIMBROL beaches will greatly facilitate artillery operations ashore and still provide infantry with close support. These beaches will permit rapid movement inland; hydrographic conditions are favorable for LST's and the subsequent unloading of all supporting artillery. There is no dominating terrain immediately behind these beaches. The terrain will also favor radio communications between the artillery commander with helicopterborne BLT and the artillery regiment. This communication capability makes possible reinforcing fires of heavy artillery to the BLT. Clear weather will ensure good cross-country mobility for both tracked and wheeled vehicles. Position areas in this area will be subject to enemy observation from the high ground to the south. Ground observation is poor, and the area offers little cover for the position areas.
- c. Deductions.--The factors considered here do not modify the amounts of artillery established in subparagraph 3c, but tend to confirm these requirements. This is particularly true with regard to long-range artillery. The artillery in the direct support (less that artillery embarked with the helicopter-landed battalion) with the assault RLT's should be preloaded in LCM/LCU's and embarked in LSD/LPD's. The medium artillery should be loaded in LST's and the heavy artillery preloaded in LCU's embarked aboard LSD/LPD's.

## 5. ESTIMATED DURATION OF THE OPERATION

- a. Information.--The estimated duration of the operation is 20 days. Local operations of a mopping-up nature may continue for an additional short period and may require some artillery support.
- b. Effect of Duration of Operation on Artillery Requirements.--The short duration of the operation should eliminate any need for extensive reequipping of artillery units except for losses due to enemy action. Therefore, the artillery requirements outlined in subparagraph 3c(1) remain the same. Ammunition resupply should be based on the estimated duration of the operation plus a realistic amount as a safety margin.
- c. Deductions
  - (1) Resupply of major items of artillery equipment lost as a result of enemy action should be:

105mm howitzer.....	15%
155mm howitzer (towed).....	16%
155mm howitzer (SP).....	17%
175mm gun.....	13%
8-inch howitzer.....	18%

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Resupply of vehicles: as determined by G-4.

Resupply of communication equipment: as determined by division communications-electronics officer.

(2) Ammunition requirements are as follows:

- (a) To be embarked and landed with artillery units: basic allowance plus 2 days of ammunition.
- (b) Resupply rates are as outlined in Division Administrative/Logistics Plan 2-6. No change in artillery requirements, as determined in subparagraph 3c(1), is necessary.

6. EMPLOYMENT OF OTHER FIRE SUPPORT MEANS

a. Information.--The following naval gunfire support ships have been assigned:

4 CG  
5 DD

b. Effect of Naval Gunfire and Air Support on Artillery Requirements

- (1) Sufficient quantities of close air support should be available for the duration of the operation. In view of ample air support, no additional artillery requirements above those already determined are deemed necessary.
- (2) Despite the fact that adequate naval gunfire support is available for this operation, hydrographic conditions will not permit the fire support ships to give complete coverage of the objective area. The long ranges of the 175mm guns, self-propelled 155mm howitzers, and 8-inch howitzers are needed for deep supporting fires and to execute counterbattery missions.

c. Deductions

- (1) Ample air support makes additional artillery requirements unnecessary.
- (2) Naval gunfire support ships will not be considered as replacing any of the artillery units so far enumerated.
- (3) In view of the limitation imposed upon the gunfire ships due to hydrographic conditions, two 175mm gun batteries and two 155mm howitzer batteries (SP) will be required in order to provide sufficient long-range fire support.

7. EMPLOYMENT OF NUCLEAR OR CHEMICAL WEAPONS

Nuclear or chemical weapons will be available to support the operation. Preparations must be made to employ nuclear or chemical weapons if directed.

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## 8. CONCLUSIONS

a. Artillery Required

- (1) Based on the mission, scheme of maneuver, and enemy forces, the following artillery requirements were determined:
  - 1 Artillery regiment (10th Marines); plus,
    - 2 155mm howitzer batteries (SP), FMF
    - 2 175mm gun batteries (SP), FMF
    - 1 8-inch howitzer battery (SP), FMF
    - 1 field artillery group (FAG) headquarters, FMF
- (2) Paragraph 4 confirmed the need for additional artillery (in the amounts shown above) and pointed out the need for long-range artillery. It also determined that the artillery providing direct support to the waterborne assault should be landed in LCM's. The artillery in direct support of BLT 3/8 (helicopter-borne BLT) will be embarked aboard the LPH with that BLT.
- (3) Paragraph 5 did not alter the artillery requirements indicated.
- (4) Paragraph 6 indicated that naval gunfire ships would not replace any of the artillery units.
- (5) Summarizing, we estimate that the following artillery will be required for the operation:
  - 1 artillery regiment (10th Marines):
    - 3 artillery battalions, each comprising:
      - 3 105mm howitzer batteries
      - 1 155mm howitzer battery
    - 1 field artillery group (FAG) headquarters, controlling:
      - 2 175mm gun batteries (SP), FMF
      - 1 8-inch howitzer battery (SP), FMF
      - 2 155mm howitzer batteries (SP), FMF

b. Artillery Ammunition Required

- (1) Embarked and landed on D-day:
  - Basic allowance plus 2 days.
- (2) Resupply rates as outlined in Division Administrative/Logistics Plan 2-6\_.
- (3) Special allowances of fuzes and shells:
  - Division 155mm howitzer batteries carry 50 percent additional illumination.

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c. Special and Resupply Equipment Required(1) Replacement Weapons

105mm howitzer .....	15%
155mm howitzer (towed) .....	16%
155mm howitzer (SP) .....	17%
175mm gun .....	13%
8-inch howitzer .....	18%

(2) Replacement vehicles: as determined by G-4.

(3) Replacement communication equipment: as determined by division communications-electronics officer.

d. Shipping, Landing Craft, and Landing Vehicles Required.--(NOTE: The following estimates are NOT based on actual requirements; these would be available from the units concerned as a part of their embarkation plans.)(1) Ships

10th Marines .....	14 LST
2 175mm gun batteries .....	2 LSD/LPD
1 8-inch howitzer battery .....	1 LSD/LPD
2 155mm howitzer batteries ....	2 LSD/LPD

(2) Landing Craft

10th Marines .....	3 LCVF
1 headquarters battery, FAG ...	6 LCVF
2 175mm gun batteries .....	6 LCU, 2 LCM
1 8-inch howitzer battery .....	3 LCU, 1 LCM
2 155mm howitzer batteries ....	6 LCU, 2 LCM

(3) Landing Vehicles.--The artillery in direct support and the reconnaissance/command groups of the artillery units should be landed in landing craft. The LCM is recommended for these groups.

10th Marines .....	100 LCM
1 headquarters battery, FAG ...	8 LCM

(Signature)

A. J. JONES  
Colonel, U.S. Marine Corps  
Commanding

## ANNEXES:

A - ----  
B - ----  
(etc.)

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## APPENDIX C

## SAMPLE FIRE SUPPORT PLAN (MAF)

## CLASSIFICATION

Copy no. \_\_\_ of \_\_\_ copies  
I Marine Amphibious Force (TF 46)  
LORAYS, TOBAGA  
010900 July 19\_\_\_  
114-T-1

Appendix 12 (Fire Support) to Annex C (Operations) to Operations Order 15-7\_

Ref: (a) Map, Series J741, Sheets II, III

Time Zone: ZULU

## 1. SITUATION

a. Enemy Forces.--Annex B (Intelligence).

b. Friendly Forces

(1) TG 43.1 supports I MAF with naval gunfire.

(2) TF 41 provides air support

(3) TG 46.3 provides air support on order when established ashore.

c. Attachments and Detachments.--Annex A (Task Organization).

## 2. MISSION

Commencing at H-hour, D-day, Landing Force (TF 46, I Marine Amphibious Force) lands, seizes, occupies, and defends the \_\_\_ area of \_\_\_ in order to permit the landing and initiation of further operations by follow-on U.S. Army forces. Fire support elements support the landing of I MAF with nuclear, chemical, and conventional fires. Priority of fires to 1st Marine Division. Fire special and conventional preparation at H-30.

## 3. EXECUTION

a. Concept of Operations.--Operation Order 15-7\_.

b. Air Support

(1) General

(a) Current air operations continue.

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(b) Priority of air support to 1st Marine Division (TG 46.1).

(2) Allocation

(a) TF 41 supports I MAF with 70 attack sorties daily.

(b) 1st MAW supports per SOP.

(3) Miscellaneous

(a) DASC colocated with MAF FSCC when ashore.

(b) Tab A (Air Fire Support).

c. Artillery Support

(1) General.--Artillery will land on order, occupy positions to be designated, and provide artillery support for the landing forces.

(2) Organization for Combat

(a) 1st Field Artillery Group:

Headquarters Battery  
1st 175mm Gun Battery (SP)  
3d 175mm Gun Battery (SP)  
1st 8-Inch Howitzer Battery (SP)  
1st 155mm Howitzer Battery (SP)

1 General support, reinforce 11th Marines.

2 Land on order over beaches to be designated.

3 Position areas and zones of fire: Tab B (Artillery Fire Support).

(b) 4th Field Artillery Group:

Headquarters Battery  
4th 175mm Gun Battery (SP)  
8th 175mm Gun Battery (SP)  
8th 8-Inch Howitzer Battery (SP)  
8th 155mm Howitzer Battery (SP)

1 General support, reinforce 12th Marines.

2 Land on order over beaches to be designated.

3 Position areas and zones of fire: Tab B (Artillery Fire Support).

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(3) Miscellaneous

(a) Priority of nonnuclear fires initially to 1st Marine Division.

(b) Tab B (Artillery Fire Support).

d. Naval Gunfire Support

(1) General.--TG 43.1 supports I MAF during period 120400 to 140400 August. Ships will participate in preparation fires with conventional ammunition.

(2) Allocations

(a) TU 43.1.1 supports 1st Marine Division.

(b) TU 43.1.2 supports 3d Marine Division.

(3) Miscellaneous.--Tab C (Naval Gunfire Support).

e. Chemical Support

(1) General.--Toxic chemical agents will be employed on enemy forward positions to support the landing.

(2) Assignment.--(120430 August - 140600 August).

UNIT	Total (Less Air) GB/VX	105mm How GB	155mm How GB/VX	8" How GB/VX	Air GB (Bomb)	Air VX (Spray Tank)
I MAF	1080/540		1000/500	80/40	200	26
1st Div	4660/1080	3000	1500/1000	160/80	120	10
3d Div	4660/1080	3000	1500/1000	160/80	170	10

(3) Miscellaneous

(a) Employment of riot control and incapacitating agents in accordance with Tab D (Chemical Fire Support).

(b) Resupply.--Appendix 6 (Nonnuclear Ammunition), Annex D (Logistics).

f. Nuclear Support(1) General

(a) Eighty (80) nuclear weapons assigned to I MAF. Yields from .5 to 50 KT.

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- (b) Attack means within MAF are cannon and attack aircraft.  
Priority of air delivered weapons to 1st Marine Division.

(2) Assignment.--(120430-160600 August 19\_\_)

	TOTAL	155 (MRC) 0.5 KT	8" (MRC) 1 KT, 2 KT	AIR 5, 10, 20, 50 KT	ADM .5 KT/1 KT
I MAF	80	27	10	11	6/8
MAF TGTS	7	3	1	1	-
MAF RES	33	6	3	2	6/8
1st DIV	20	9	3	4	
3d DIV	20	9	3	4	

- (3) Miscellaneous.--Tab E (Nuclear Fire Support) and Appendix 7  
(Special Ammunition Logistics, Annex D (Logistics)).

g. Coordinating Instructions

- (1) FSCL and NFL's: Tab H (Fire Support Coordination).
- (2) Air targets to be marked with yellow smoke.
- (3) Troop Safety
  - (a) Preclusion requirements and troop safety as indicated in Tab E (Nuclear Fire Support) and Tab D (Chemical Fire Support).
  - (b) Warning per MAF SOP.
- (4) Notification of intent to use nuclear weapons to MAF FSCC when effects extend beyond Division boundaries.
- (5) Report nuclear poststrike damage assessment to MAF FSCC upon completion of strike.
- (6) Counterbattery policy: Active.
- (7) Countermortar policy: Active.
- (8) Target numbers: Tab H.
- (9) Landing plan: Annex R.
- (10) Antimechanized plan: Appendix 14, Annex C.
- (11) Aerial observation: Artillery regiments maintain one AO during daylight hours. FAG's maintain AO as required. See Appendix S, Annex P (Air Operations).

Page number

CLASSIFICATION



## CLASSIFICATION

## 1. ADMINISTRATION AND LOGISTICS

- a. Annex D (Logistics).
- b. Class V ASR 120400-160400 August.

- (1) 105mm How - 100
- (2) 155mm How - 80
- (3) 175mm Gun - 60
- (4) 8" How - 40

c. Special Ammunition Load (SAL)

- (1) 8" Firing Batteries

<u>1 KT</u>	<u>2 KT</u>	<u>GB</u>	<u>VX</u>
4	5	70	30

- (2) Divisions establish SAL. Include sufficient munitions to attack targets assigned by MAF.

## 5. COMMAND AND SIGNAL

- a. Signal--Annex K (Communications-Electronics).

b. Command Posts

- (1) Afloat

I MAF FSCC (colocated with  
 TF 45 ATF-SACC)  
 11th Marines  
 12th Marines  
 1st Field Arty Gp

USS _____	(LCC _____)
USS _____	(LPD _____)
USS _____	(LPD _____)
USS _____	(LST _____)

- (2) Ashore--Units report location when established.

c. Miscellaneous--Annex J (Command Relationships).

## ACKNOWLEDGE RECEIPT

BY COMMAND OF LIEUTENANT GENERAL ALFA

B. C. DELTA  
 Brigadier General, U.S. Marine Corps  
 Chief of Staff

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TABS: (All omitted)

- A - Air Fire Support
- B - Artillery Fire Support
- C - Naval Gunfire Support
- D - Chemical Fire Support
- E - Nuclear Fire Support
- H - Fire Support Coordination
- I - Supporting Arms Summary (SASUM) Report Form

DISTRIBUTION: Annex Z (Distribution)

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## APPENDIX D

## SAMPLE FIRE SUPPORT PLAN (DIVISION)

## CLASSIFICATION

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189-R-5

Appendix 12 (Fire Support) to Annex C (Operations) to Operation Order 9-\_\_

Ref: (a) Map, Series J741, Sheets II, III

Time Zone: ZULU

## 1. SITUATION

a. Enemy Forces.--Annex B (Intelligence).

b. Friendly Forces

- (1) I MAF lands at H-hour, D-day, seizes, occupies, and defends the \_\_\_\_\_ area of \_\_\_\_\_.
- (2) 3d Marine Division (TG 46.2), on right, secures objectives in zone and supports attack of 1st Marine Division.
- (3) TF 41 supports I MAF with allocation of 70 attack sorties daily.
- (4) Artillery Support
  - (a) 1st 175mm Gun Btry (SP): GS-R 11th Mar
  - (b) 3d 175mm Gun Btry (SP): GS 1st MarDiv
  - (c) 1st 155mm How Btry (SP): GS-R 11th Mar
  - (d) 1st 8" How Btry (SP): GS-R 11th Mar
- (5) Naval Gunfire Support.--Fire Support Unit One (TU 43.1.1) supports 1st Marine Division.

c. Attachments and Detachments.--Annex A (Task Organization).

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## CLASSIFICATION

## 2. MISSION

Fire support elements support 1st Marine Division with nuclear, chemical, and conventional fires. Division lands at H-hour, D-day, to seize ATF + LF objectives in zone and secure the FBHL. Priority of fires to RLT-5 initially.

## 3. EXECUTION

a. Concept of Operation.--Operation Order 9-7\_.

b. Air Support

(1) General

(a) Aircraft supports landing with delivery of special and conventional ordnance.

(b) Priority of support initially to 5th Marines.

(2) Availability

(a) Division allocated 30 sorties daily from TF 41.

(b) 1st MAW support per SOP.

(3) Miscellaneous.--Tab A (Air Fire Support).

c. Artillery Support

(1) General.--Artillery will land on order, occupy positions, and provide special and conventional support to the 1st Marine Division (Rein).

(2) Organization for Combat

(a) Organic Artillery

1st Bn, 11th Marines: DS RLT-1

2d Bn, 11th Marines: DS RLT-5

3d Bn, 11th Marines: GS-R 2/11, 0/0 DS RLT-7

(b) Reinforcing Artillery

1st 175mm Gun Btry (SP): GS-4 11th Marines

3d 175mm Gun Btry (SP): GS 1st MarDiv

1st 155mm How Btry (SP): GS-4 11th Marines

1st 8" How Btry (SP): GS-R 11th Marines

(3) Miscellaneous

(a) Priority of fires to RLT-5; 0/0 priority to RLT-7 when committed.

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## CLASSIFICATION

(b) Priority of position areas.

- 1 Nuclear delivery units.
- 2 Units in direct support.
- 3 Other.

(c) Tab B (Artillery Fire Support).

d. Naval Gunfire Support

(1) General.--Fire Support Unit One (TU 43.1.1) will support the landing with conventional preparation fires from H-25 to H-5, and support operations ashore with naval gunfire.

(2) Assignment of Support.--(Effective H-hour).

(a) CG 1: GS 1st Marine Division

(b) DD 1: GS 1st Marine Division

(c) CG 2: GS RLT-5

(d) DD 2: GS RLT-1

(e) DD 3: GS RLT-5

(f) DD 4: DS BLT 1/1

(g) DD 5: DS BLT 2/1

(h) DD 6: DS BLT 1/5

(i) DD 7: DS BLT 2/5

(3) Miscellaneous

(a) Priority of fires to RLT-5.

(b) Tab C (Naval Gunfire Support).

e. Chemical Support

(1) General.--At H-45 to H-30, fire support agencies will employ toxic chemicals on enemy beach defensive positions to support the landing.

(2) Assignment (H-Hour, D-Day).--0600Z, D+2.

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## CLASSIFICATION

UNIT	Total (Less Air) GB/VX	105mm How GB	155mm How GB/VX	8" How GB/VX	Air GB (Bomb)	Air VX (Spray Tank)
1st MarDiv	1960/480	1200	600/400	160/80	120	10
RLT-1	900/200	600	300/200	-		
RLT-5	900/200	600	300/200	-		
RLT-7	900/200	600	300/200			

(3) Miscellaneous

(a) Weather dissemination per SOP.

(b) Tab D (Chemical Fire Support).

f. Nuclear Support(1) General.--Nuclear preparation will be fired from H-25 to H-15.(2) Assignment.--120430-140600 August.

UNIT	TOTAL	155mm	8"		AIR			
		0.5 KT	1 KT	2 KT	5 KT	10 KT	20 KT	50 KT
DIVISION	8	3	2	1	1	1		
DIVISION RES	9	3	1	3			1	1
RLT-1	1	1						
RLT-5	1	1						
RLT-7	1	1						
	20	9	3	4	1	1	1	1

(3) Miscellaneous

(a) Tab D (Nuclear Fire Support).

(b) Appendix 7 (Special Ammunition Logistics), Annex D (Logistics).

g. Coordinating Instructions

(1) FSCL: Tab H (Fire Support Coordination).

(2) D-day: 12 August 19\_\_ (Tentative).

(3) H+L-hours: To be announced.

(4) Target numbers: Tab H (Fire Support Coordination).

(5) Counterbattery policy: Active.

Page number

CLASSIFICATION

## CLASSIFICATION

- (6) Countermortar policy: Active.
- (7) Air observation: Appendix 5 to Annex P (Air Operations).
- (8) Ammunition restrictions: Units will not expend more than 80 percent of available supply rate without approval.
- (9) Antimechanized: Annex C, Appendix 14.
- (10) No-fire lines: Tab H.
- (11) Landing plan: Annex R.
- (12) Maximum ordinate of surface originated fires in Area HOTEL from 120830 to 121130 August is 3,000 meters.
- (13) Target AE 2003 to be fired by NGF only if not positively destroyed by air.
- (14) Notification of intent to fire nuclear weapons to Division FSCC if effects (except DAZZLE) will extend beyond RLT boundaries.
- (15) On-call VX toxic chemical agents may be used to restrict movement and to interdict routes of enemy movement.

## 4. ADMINISTRATIVE AND LOGISTICS

- a. Annex D (Logistics).
- b. Class V ASR D-Day: D+2.
  - (1) 105mm How - 100
  - (2) 155mm How - 80
  - (3) 175mm Gun - 60
  - (4) 8" How - 40
- c. ASP Locations
  - (1) ASP-1: 214013
  - (2) ASP-2: 271037
- d. SASP Location
  - (1) SASP-1: 201034
  - (2) SASP-2: 251001

Page number

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## CLASSIFICATION

e. Special Ammunition Load (SAL)(1) 155mm Batteries

<u>0.5 KT</u>	<u>GB</u>	<u>VX</u>
4	500	40

(2) 105mm Batteries

GB  
300

## 5. COMMAND AND SIGNAL

a. Signal.--Annex K (Communications-Electronics).b. Command Post(1) Afloat

11th Marines (Rein)	USS _____	(LPD _____)
1st Field Artillery Group	USS _____	(LPD _____)

(2) Ashore

(a) FSCC at Division CP.

(b) 11th Marines CP (Alt Div CP): To be announced.

## ACKNOWLEDGE RECEIPT

BY COMMAND OF MAJOR GENERAL HOTEL

I. J. KEEN  
Colonel, U.S. Marine Corps  
Chief of Staff

## TABS:

A - Air Fire Support  
B - Artillery Fire Support  
C - Naval Gunfire Support  
D - Chemical Fire Support  
E - Nuclear Fire Support  
H - Fire Support Coordination  
I - Supporting Arms Summary (SASUM) Report Form

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Tab A (Air Fire Support) to Appendix 12 (Fire Support) to Annex C  
(Operations) to Operation Order 9-\_\_

Ref: (a) Map: Series J741, Sheets II, III  
(b) FMFM 5-4, Offensive Air Support

Time Zone: ZULU

## 1. SITUATION

- a. Enemy Forces.--Annex B (Intelligence).
- b. Friendly Forces
  - (1) TF 41 supports I MAF with 70 attack sorties daily.
  - (2) 1st MAW supports I MAF with CAS.

## 2. EXECUTION

- a. On call close air support requests to DASC (call sign: HORNBLOWER).
- b. Air support radar teams (ASRT) available for control during periods of reduced visibility.
- c. FAC's (ground/airborne) will control attacks on targets that can be observed.
- d. Target marking: 1 yellow smoke or as directed.
- e. Emergency signal to lift airstrike: White star cluster.
- f. Emergency code to lift airstrike: BEATNIK, acknowledge.
- g. Chemical delivery: Tab D (Chemical Fire Support).
- h. Nuclear delivery: Tab E (Nuclear Fire Support).
- i. Request for poststrike analysis by air IAW Div SOP.
- j. Request for aerial observers IAW Div SOP.

## 3. MISCELLANEOUS

- a. Coordinating Instructions
  - (1) FSCL effective 120600 August.

Page number

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b. Air Safety

- (1) Current aircraft identification system in effect.
- (2) Artillery check fire from H-5 to H+5 D-day for air strafe.
- (3) DASC transmits strike warning..
- (4) Five minutes minimum separation time between air delivered nuclear weapons.

4. COMMAND AND SIGNAL

a. Signal.--Annex K (Communications).

b. Command Posts

- (1) DASC located at I MAF CP.

ACKNOWLEDGE RECEIPT

BY COMMAND OF MAJOR GENERAL HOTEL

I. J. KEEN  
Colonel, U.S. Marine Corps  
Chief of Staff

ENCLOSURES:

- 1 - Preplanned Close Air Support
- 2 - Air Targets
- 3 - Air Fire Target Overlay

DISTRIBUTION: Annex Z (Distribution)

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Enclosure 1 (Preplanned Close Air Support) to Tab A (Air Fire Support) to Appendix 12 (Fire Support) to Appendix 12 (Fire Support) to Annex C (Operations) to Operation Order 9-     

LN #	(a) TGT #	(b) TYPE MSN	(c) AIRCRAFT ORDNANCE	(d) TOT/ TIME ON STA	(e) ATK DIR	(f) PULL OUT DIRECTION	(g) TGT MARKING	(h) CONTROL AGENCY	(i) REMARKS
1	AZ 0001	PREP	VMA 10 KST	H-25	090°	-	-	DASC	Briefing and control pts by LF Air.
2	AA 9001	PREP	VMA WETEYE GB	H-25	040°	-	-	DASC	-do-
3	AZ 9029	CAS	VMA SPRAY VX	GRD ALERT ON CALL H-60 to H+60	090°	-	-	DASC	-do-
4	AZ 9031	CAS	VMA SPRAY VX	AIR ALERT ON CALL H-25 to H+10	100°	-	-	DASC	-do-
5	XZ 2003	CAS	VMA 500 GP RKT/20MM	H-2 HRS	045°	-	RKT	TAC (A)	TAC (A) MARKS CTR TGT W/RKTS
6	AB 3536	CAS	VMA NAPALM 20MM	H-5 to H+5	090°	-	WP	FAC	NGF MARKS ON REQ FLT LDR
7	AB 1261	CAS	VMA NAPALM SNAKE EYE	H-4	060°	-	YELLOW SMOKE	FAC	ARTY MARKS ON REQ FLT LDR
8	XZ 2005	CAS	VMA 500 GP RKT/20MM	H-HOUR	070°	-	RKT	TAC (A)	TAC (A) MARKS CTR TGT W/RKTS

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App. D

FMFM 7-4

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Enclosure 2 (Air Targets) to Tab A (Air Fire Support) to Appendix 12 (Fire Support) to  
 Annex C (Operations) to Operation Order 9--

LN #	(a) TGT #	(b) TGT DESCRIPTION	(c) TGT COORD-UTM	(d) SIZE (METERS)	(e) DIRECTION/DISTANCE FRIENDLY UNITS	(f) SOURCE	(g) REMARKS
1	AZ 0001	RKT LCHR	26601790	Pt Tgt 2000X 1000	170°/-	II-100	Heavy Foliage Immediate Casualties
2	AA 9001	INF ASSY AREA	248128	1200X 800	180°/2000	AO-100	Immediate Cas- ualties Contam- inate Area
3	AZ 9029	INF ASSY AREA	279128	2300X 500	175°/2000	AO-100	-do-
4	AZ 9031	INF ASSY AREA	25901350 to 26201350	Pt Tgt	190°/3500	AO-100	If not destroyed by Air, NGF will atk
5	XZ 2003	AA RADAR SITE	249168	100X 200	140°/6500M	II-50	Sked by NGF
6	AB 3536	TRENCH W/MG	290116	Pt Tgt 200X 200	180°/500M	OP-50	Sked by Arty
7	AB 1261	AW BUNKER	270115	180°/7000M	180°/500M	AO-100	In Defilade
8	XZ 2005	FROG 2 SITE	29501750			II-50	

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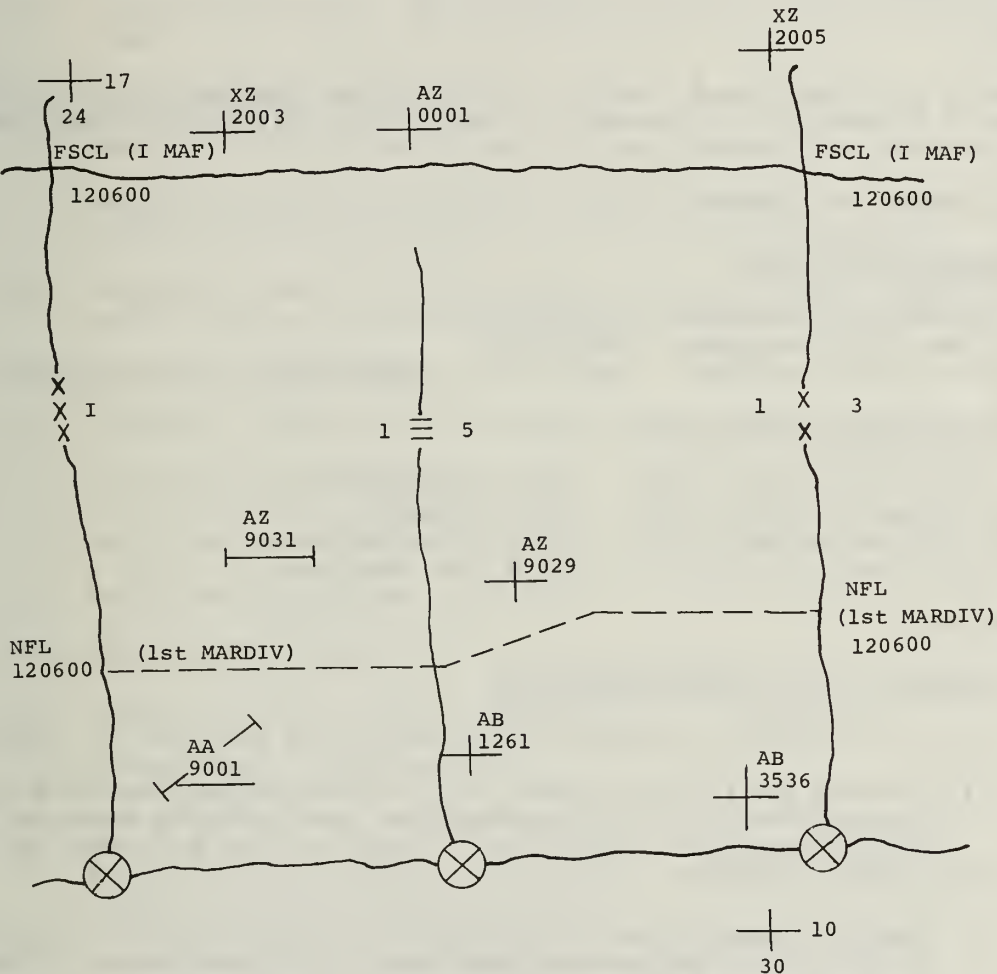
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Enclosure 3 (Air Target Overlay) to Tab A (Air Fire Support) to Appendix 12  
 (Fire Support) to Annex C (Operations) to Operation Order 9-\_\_.

Ref: (a) Map: Series J741, Sheets II, III

Time Zone: ZULU



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Tab B (Artillery Fire Support) to Appendix 12 (Fire Support) to Annex C (Operations) to Operation Order 9-\_\_

Ref: (a) Map, AMS Series J471, Sheets II, III  
(b) Firing Chart: 1:25,000 Grid Sheet

Time Zone: ZULU

## 1. GENERAL

Division artillery land D-day, on order, over beaches and in landing zones to be designated; support attack of 1st Marine Division (Rein) with special and conventional fires.

## 2. ORGANIZATION FOR COMBAT

a. Organic Artillery

1st Bn, 11th Marines: DS RLT-1  
2d Bn, 11th Marines: DS RLT-5  
3d Bn, 11th Marines: GS-R 2/11, 0/0 DS RLT-7

b. Reinforcing Artillery

1st 175mm Gun Btry (SP): GS-R 11th Marines  
3d 175mm Gun Btry (SP): GS 1st MarDiv  
1st 155mm How Btry (SP): GS-R 11th Marines  
1st 8" How Btry (SP): GS-R 11th Marines

## 3. EXECUTION

a. Concept of Artillery Employment

- (1) RLT-5 making the main attack will have priority of fires.
- (2) Initial artillery support for the helicopter-landed BLT will be provided by the attachment to that BLT of a battery of 105mm howtizers. Additional fires will be provided by long-range artillery.
- (3) General support and reinforcing fires will be provided by the artillery battalion not committed to direct support, and by the batteries of the 1st Field Artillery Group.

b. 1st Battalion (Rein), 11th Marines

1st Battalion, 11th Marines  
CMR Team, Headquarters Battery, 11th Marines

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## CLASSIFICATION

- (1) Direct support RLT-1.
- (2) Land on order over BLUE beaches; position areas, Enclosure 2; zone of fire, zone of action RLT-1.

c. 2d Battalion (Rein), 11th Marines

2d Battalion, 11th Marines  
CMR Team, Headquarters Battery, 11th Marines

- (1) Direct support RLT-5.
- (2) Land on order over RED beaches; position areas, Enclosure 2; zone of fire, zone of action RLT-5.

d. 3d Battalion, 11th Marines

- (1) Detach a battery to BLT 1/7.
- (2) General support, reinforce 2d Battalion, 11th Marines. Be prepared for direct support of RLT-7 when committed.
- (3) Land on order over RED beaches; position areas, Enclosure 2; zone of fire, as prescribed by 2d Battalion, 11th Marines.

e. Coordinating Instructions

- (1) Position areas and fire capabilities: Enclosure 2.
- (2) Firing Chart: Reference (b).
- (3) Registrations: No restrictions.
- (4) Registration points: Enclosure 3.
- (5) Survey: Enclosure 6.
- (6) Target numbers: Tab H, Appendix 12, Annex C.
- (7) Meteorology: Enclosure 6.
- (8) Air observation: Appendix 5, Annex P (Air Operations).
- (9) Ammunition restriction: Units will not expend more than 80 percent of ASR without approval.
- (10) Antimechanized: Appendix 14, Annex C.
- (11) No-fire lines: Tab H, Appendix 12, Annex C.
- (12) NC fires: Tabs D and E, Appendix 12, Annex C.

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## CLASSIFICATION

- (13) Flak suppression: Appendix 8, Annex P (Air Operations).
- (14) Restrictions on fires: Tab H, Appendix 12, Annex C.
- (15) Maximum ordinate of surface originated fires in Area HOTEL from 120830 to 121130 August is 3,000 meters.

## 4. ADMINISTRATIVE AND LOGISTICS

- a. Annex D (Logistics).
- b. Available Supply Rate (D-day to D+2)
  - (1) 105mm How - 100
  - (2) 155mm How - 80
  - (3) 175mm Gun - 60
  - (4) 8" How - 40
- c. ASP Locations
  - (1) ASP-1: 214013
  - (2) ASP-2: 271037
- d. Prescribed Load.--BA-V + 2 DOA
- e. Special Ammunition
  - (1) Tab D (Chemical Fire Support).
  - (2) Tab E (Nuclear Fire Support)
  - (3) Appendix 7 (Special Ammunition Logistics), Annex D (Logistics).

## 5. COMMAND AND SIGNAL

- a. Annex J (Command Relationships).
- b. Annex K (Communications-Electronics).
- c. Command Posts
  - (1) Afloat

11th Marines (Rein)	USS _____	(LPD _____)
1st Battalion (Rein), 11th Marines	USS _____	(LST _____)
2d Battalion (Rein), 11th Marines	USS _____	(LST _____)
3d Battalion (-), 11th Marines	USS _____	(LST _____)
1st Field Artillery Group	USS _____	(LSD _____)
___ Battery, 1st Bn, 11th Marines	USS _____	(LPH _____)

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(2) Ashore.--Enclosure 2. Units report location when established.

ACKNOWLEDGE RECEIPT

BY COMMAND OF MAJOR GENERAL HOTEL

I. J. KEEN  
Colonel, U.S. Marine Corps  
Chief of Staff

## ENCLOSURES:

- 1 - Artillery Targets
- 2 - Initial Position Area/Fire Capabilities
- 3 - Artillery Target Overlay
- 4 - Artillery Fire Support Tables
- 5 - Observation Requirements (Omitted)
- 6 - Survey/Metro Plan (Omitted)

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LN	(a) TGT #	(b) DESCRIPTION	(c) LOCATION	(d) ALTITUDE (m)	(e) SIZE (m) L W		(f) ATTITUDE (mils)	(g) SOURCE/ ACCURACY	(h) REMARKS	PREP GROUP
X	X	X	X	X	X	X	X			
	AY									
7	8016	6-155mm How	299133	310	300	150	1850	Z (g)-100	SCHD	X A2Y
	AY									
8	8019	2-140mm Rkt Lchr	297131	300				II-50	SCHD	X A2Y
X	X	X	X	X	X	X	X			
	AZ									
13	1010	Regt CP	284130	295				PW-100	SCHD	X
	AB									
14	1261	AW Bunker	270115	306				AO-100	SCHD	X

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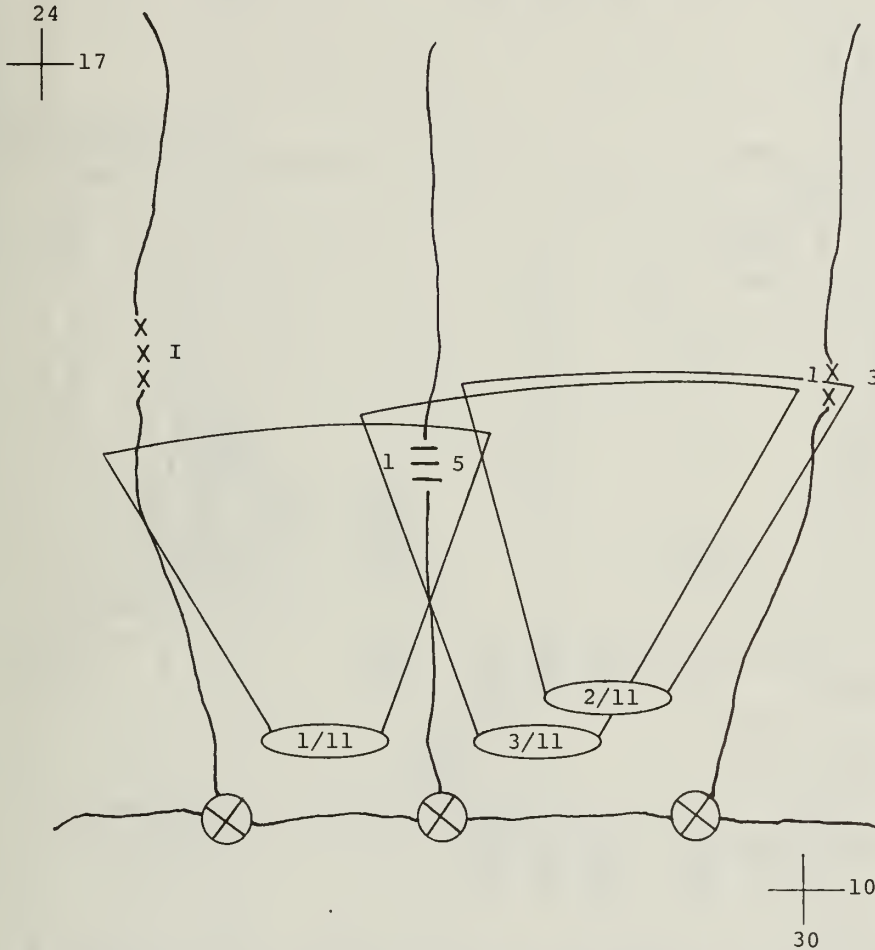
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Enclosure 2 (Initial Position Area/Fire Capabilities) to Tab B (Artillery Fire Support) to Appendix 12 (Fire Support) to Annex C (Operations) to Operation Order 9-\_\_

Ref: (a) Map: Series J741, Sheets II, III



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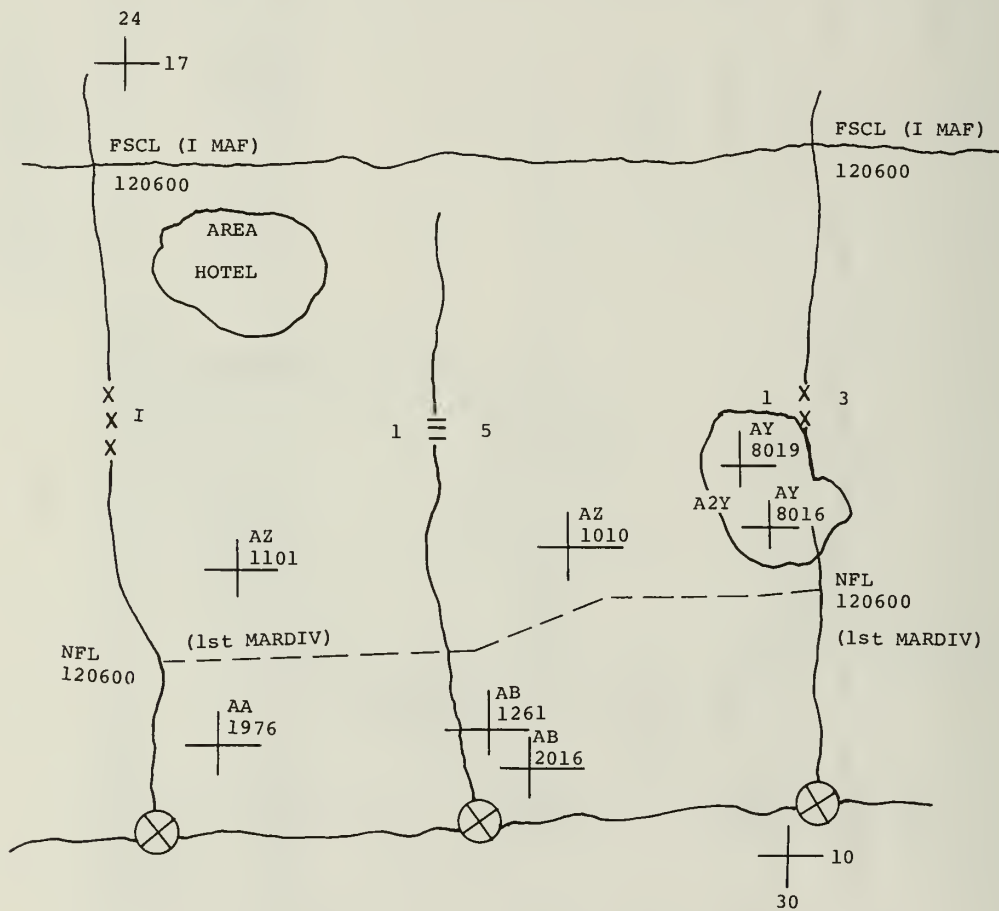
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Enclosure 3 (Artillery Target Overlay) to Tab B (Artillery Fire Support) to  
 Appendix 12 (Fire Support) to Annex C (Operations) to Operation Order 9-\_\_

Ref: (a) Map: Series J741, Sheets II, III



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Enclosure 4-1 (Artillery Fire Support Table) to Tab B (Artillery Fire Support) to Appendix  
12 (Fire Support) to Annex C (Operations) to Operation Order 9-\_\_

PREPARATION FIRE

LN NO	FIRING UNIT	+25	+30	+35	+40	SCHEDULED TARGETS +45 +50 +55 +60 +65 +70	ON CALL TGTS	REMARKS
1	A/1/11					AA1976 60		(a) TOT H+25 SH GB
X	X	X	X	X	X	X		
4	D/2/11				AB2016 30	AB1261 30		(b) TOT H+45 50% VT
X	X	X	X	X	X	X		
10	K/1/11		AZ9117 18(a)		AZ1010 48(b)		AZ1011 A1Y	
X	X	X	X	X	X	X		
11	M/2/11		AZ9117 18(a)		AZ1010 48(b)		AZ1012 A1Y	
X	X	X	X	X	X	X		
12	L/3/11		AZ9117 18(a)		AZ1010 48(b)		AZ1013 A1Y	
X	X	X	X	X	X	X		
14	3d 175G		AY8016 30				A2Y,A3Y	
X	X	X	X	X	X	X		
15	1st 8" How		AY8019 30				AZ8101 A2Y,A3Y	

(NOTE: This is only an extract and not intended to represent a complete document; it is not usually found in an order for an amphibious operation.)

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 1112200 July 19     

Enclosure 4-2 (Artillery Fire Support Table (Groups of Targets)) to Tab B (Artillery Fire Support) to Appendix 12 (Fire Support) to Annex C (Operations) to Operation Order 9-    

(a)		(b)		(c)
LN NO	FIRING UNIT	ALY	GROUPS OF TARGETS A2Y A3Y	REMARKS
X X X X X X X X	X X X X X X X X			These groups are part of the counter-battery program of
10	K/1/11	AY8008 18		
11	L/2/11	AY8009 18		
12	M/3/11	AY8010 18		
13	1G		AY8015 18 AY8020 12	
14	3G		AY8016 18 AY8021 12	
X X X X X X X X	X X X X X X X X			

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Tab C (Naval Gunfire Support) to Appendix 2 (Fire Support) to Annex C  
(Operations) to Operation Order 9-\_\_

Ref: (a) Map: Series J741, Sheets II, III  
(b) NWIP 22-2( )  
(c) FMFM 7-2

Time Zone: ZULU

(For complete examples of this tab, see FMFM 7-2,  
Naval Gunfire Support.)

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Tab D (Chemical Fire Support) to Appendix 12 (Fire Support) to Annex C (Operations) to Operation Order 9-\_\_

Ref: (a) Map: Series J741, Sheets II, III  
 (b) DIV O \_\_\_\_, SOP for Chemical Weapons Employment

Time Zone: ZULU

## 1. SITUATION

- a. Enemy Forces.--Annex B (Intelligence).
- b. Friendly Forces.--Annex \_\_ (Task Organization).

## 2. MISSION

Fire support agencies will employ toxic chemicals to assist in the landing and subsequent operations ashore.

## 3. EXECUTION

a. Concept of Operations

- (1) A 5-minute toxic chemical preparation will be made from H-45 to H-30 by aircraft of TF 41.
- (2) On-call VX chemicals will be used to restrict movement and to interdict routes of enemy movement.

b. Assignment.--120430-140600 August.

UNIT	GB/VX	TOTAL (LESS AIR)			AIR	
		105mm How GB	155mm How GB/VX	8" How GB/VX	GB Bomb	VX Spray
1st MarDiv	1960/480	1200	600/400	160/80	120	10
RLT-1	900/200	600	300/200			
RLT-5	900/200	600	300/200			
RLT-7	900/200	600	300/200			

c. Coordinating Instructions(1) Weather

- (a) Average wind speed and direction: 4 miles per hour, SW.

Page number

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## CLASSIFICATION

(b) Average temperature: 50 degrees F.

(c) Conditions favor our use of toxic chemicals.

(2) Troops entering toxic impact areas will be masked initially.

(3) Requests for chemical support: Reference (B).

(4) Targets and description: Enclosure 1.

(5) Chemical fire target overlay: Enclosure 2.

(6) Reports in accordance with reference (b).

d. Special Ammunition Load.--Appendix 6 (Nonnuclear Ammunition) to Annex D (Logistics).

4. ADMINISTRATIVE AND LOGISTICS

a. Annex D (Logistics).

b. Appendix 6 (Nonnuclear Ammunition) to Annex D.

5. COMMAND AND SIGNAL

a. Signal.--Annex K (Communications-Electronics).

b. Command.--FSCC at division CP.

ACKNOWLEDGE RECEIPT

BY COMMAND OF MAJOR GENERAL HOTEL

I. J. KEEN  
Colonel, U.S. Marine Corps  
Chief of Staff

ENCLOSURES:

- 1 - Chemical Fire Support Tables/Targets
- 2 - Chemical Fire Target Overlay

DISTRIBUTION: Annex Z (Distribution)

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Enclosure 1 (Chemical Fire Support Table/Targets) to Tab D (Chemical Fire Support) to  
Appendix 12 (Fire Support) to Annex C (Operations) to Operation Order 9-\_\_

Ref: (a) Map: Series J741, Sheets II, III

LN NO	(a) TARGET NUMBER	(b) DESCRIPTION	(c) LOCATION DGZ	(d) ALT	(e) SIZE L W	(f) ATTITUDE (mils)	(g) WEAPON/ AMMUNITION	(h) TOT	(i) UNIT	(j) HOB	(k) REMARKS AND/OR RESULTS DESIRED
1	AA9001	Inf Assy Area	248128	300	2000 1000	750	2 sorties 12 bombs, GB (Weteye)	H-25			Immediate Casualties
2	AB9012	Def Posn	295129	285	2400 600	2100	GB 36 rds	H-25	1st 155 (SP)		-do-
	X X X X X X X X										
6	AZ9028	Def Posn	26081355	280	700 400	2200	GB 18 rds	On Call	1st 8" How Btry		
7	AZ9029	Inf Assy Area	27931282	320	1200 800		4 sorties Spray, VX	On Call			Immediate Casualties
8	AZ9031	Inf Assy Area	25901350 to 26201350	305	2300 500	1600	2 sorties Spray, VX 2 Tks per sortie	On Call			Contaminate entire area

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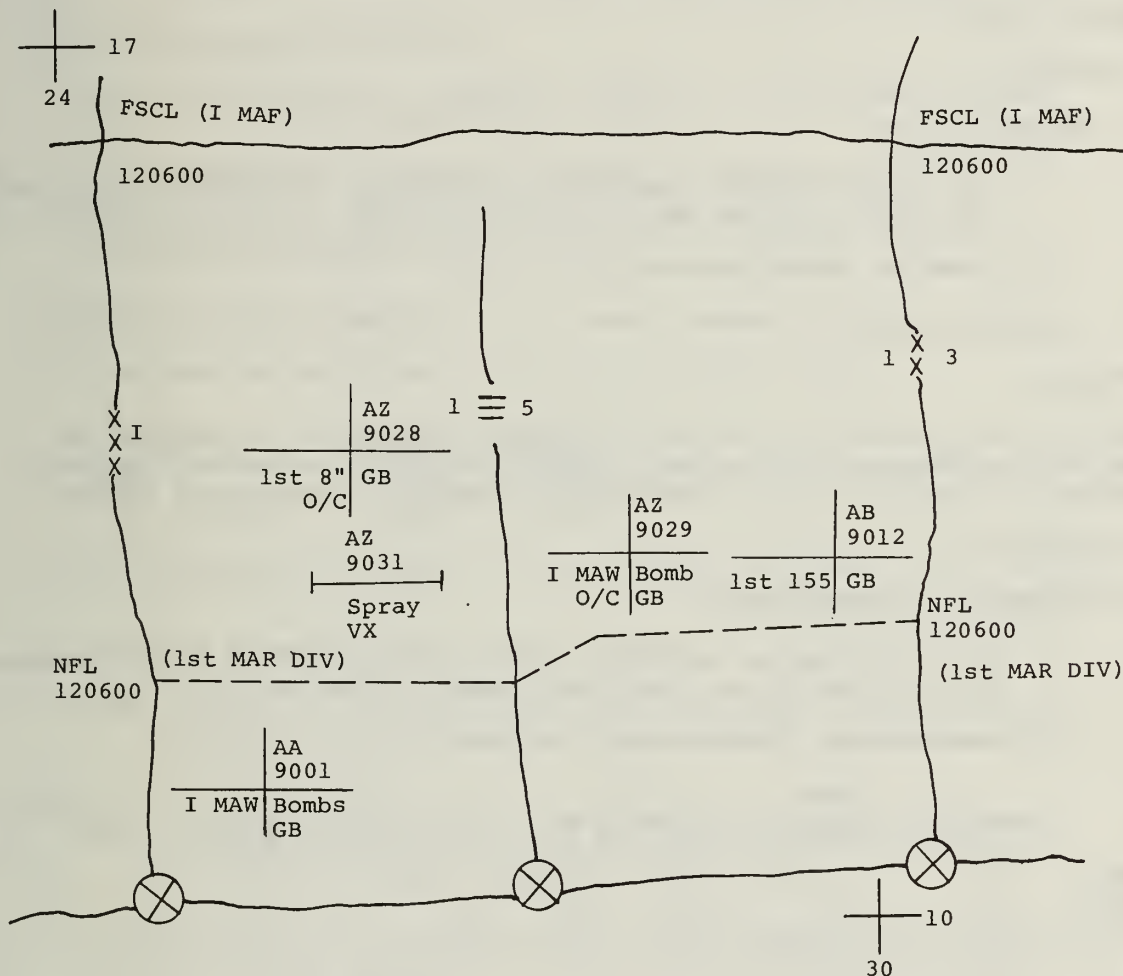
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Enclosure 2 (Chemical Fire Target Overlay) to Tab D (Chemical Fire Support)  
 to Appendix 12 (Fire Support) to Annex C (Operations) to Operation Order 9-\_\_

Ref: (a) Map: Series J741, Sheets II, III

Time Zone: ZULU



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Tab E (Nuclear Fire Support) to Appendix 12 (Fire Support) to Annex C (Operations) to Operation Order 9-\_\_

Ref: (a) Map: Series J741, Sheets II, III  
 (b) DivO \_\_\_\_\_ (SOP for Nuclear Weapons Employment)

Time Zone: ZULU

## 1. SITUATION

a. Enemy Forces

(1) The enemy has the capability to deliver, by aircraft and guided missiles, nuclear munitions with yields of 1 KT to 50 KT.

(2) Annex B (Intelligence).

b. Friendly Forces--Annex A (Task Organization).

## 2. MISSION

Fire support agencies will employ nuclear munitions to destroy or neutralize aggressor principal forward positions and second echelon forces in support of the landing and subsequent operations ashore.

## 3. EXECUTION

a. Concept of Operations

(1) Nuclear preparation will be fired from H-25 to H-15. Targets of opportunity in accordance with reference (b).

(2) Assignment (120430-140600 August):

UNIT	TOTAL	155mm	8" How		AIR				ADM	
		0.5 KT	1 KT	2 KT	5,	10,	20,	50 KT	.5 KT	1 KT
DIV TGTS	8	3	2	2			1			0
DIV RES	9	3	1	2	1		1	1		
RLT-1	1	1								
RLT-5	1	1								
RLT-7	1	1								
TOTAL	20	9	3	4	1	1	1	1		0

Page number

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- (3) RLT's 1, 5, and 7.--Request air and artillery delivered nuclear fires on targets of opportunity in support of ground operations, and coordinate troop movements with these fires.
- (4) 11th Marines
  - (a) Provide artillery delivered nuclear support in accordance with Enclosure 1 and reference (b).
  - (b) Execute tactical control of the nuclear fires of 1st 8" Howitzer Battery and 1st 155mm Howitzer Battery (SP).
- (5) 1st Engineer Battalion
  - (a) Be prepared to receive, emplace, and detonate atomic demolition munitions on order.
  - (b) Appendix 9 (Engineer), Annex D (Logistics).
- (6) Special Ammunition Load.--Appendix 7 (Special Ammunition Logistics), Annex D (Logistics).

b. Coordinating Instructions

- (1) Nuclear target numbers allocated 1st Division:
 

RLT-1	AA0001 - AA0099
RLT-5	AB0001 - AB0099
RLT-7	AC0001 - AC0099
1st Division	AZ0001 - AZ0099
- (2) Notification of intent to fire nuclear weapons to Div FSCC if effects (except dazzle) will extend beyond regimental boundaries.
- (3) Nuclear weapons will not be employed:
  - (a) Against populated areas when the effects will exceed a degree of risk equivalent to moderate risk to warned exposed personnel.
  - (b) Against historical or religious edifices, government buildings, and civilian communication facilities and utilities without approval of Div FSC.
- (4) Cancellation of nuclear strike: Notification to Div FSCC NLT 15 minutes prior to TOT. Code word is CANCELLED followed by nuclear target number.
- (5) Troop safety: SOP.
- (6) Reports: SOP.

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(7) Weapon readiness: Enclosure 3.

4. ADMINISTRATION AND LOGISTICS

a. Annex D (Logistics).

b. Appendix 7 (Special Ammunition Logistics), Annex D.

5. COMMAND AND SIGNAL

a. Signal.--Annex K (Communications-Electronics).

b. Command.--FSCC at Division CP.

ACKNOWLEDGE RECEIPT

BY COMMAND OF MAJOR GENERAL HOTEL

I. J. KEEN  
Colonel, U.S. Marine Corps  
Chief of Staff

ENCLOSURES:

- 1 - Nuclear Fire Support Table/Targets
- 2 - Nuclear Target Overlay
- 3 - Weapons Readiness

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Enclosure 1 (Nuclear Fire Support Table/Targets) to Tab E (Nuclear Fire Plan) to Appendix  
12 (Fire Support) to Annex C (Operations) to Operation Order 9-

Ref: (a) Map: Series J741, Sheets II, III

LN NO	(a) TGT NO	(b) DESCRIPTION	(c) LOCATION DGZ	(d) ALT	(e) SIZE Pt Tgt	(f) ATTITUDE (mils)	(g) WEAPON/ AMMUNITION	(h) TOT	(i) UNIT	(j) HOB	(k) REMARKS AND/OR RESULTS DESIRED
1	AZ0001	Rkt Lchr	26601690	100	Pt Tgt		Air 10 KT	H-25	1stMAW	LA	Destruction
2	X X X X X X X X										
3	AB0001	203mm Gun How Btrys	27901225	320	200		155mm .5 KT	H-18	L-2-11	LA	Neutralization
4	X X X X X X X X										
5	AA0001	MZ Bn	27181340	370	150		155mm .5 KT	H-18	K-1-11	LA	Destruction
6	X X X X X X X X										
7	X X X X X X X X										
8	AZ0002	Tank Co	29201700	380	200		155mm .5 KT	H-17	1st 155 (SP)	LA	Neutralization
9	AZ0003	Regt CP	26001460	200	300		8" 2 KT	H-20	1st 8"	LA	Neutralization
10	X X X X X X X X										
11	X X X X X X X X										

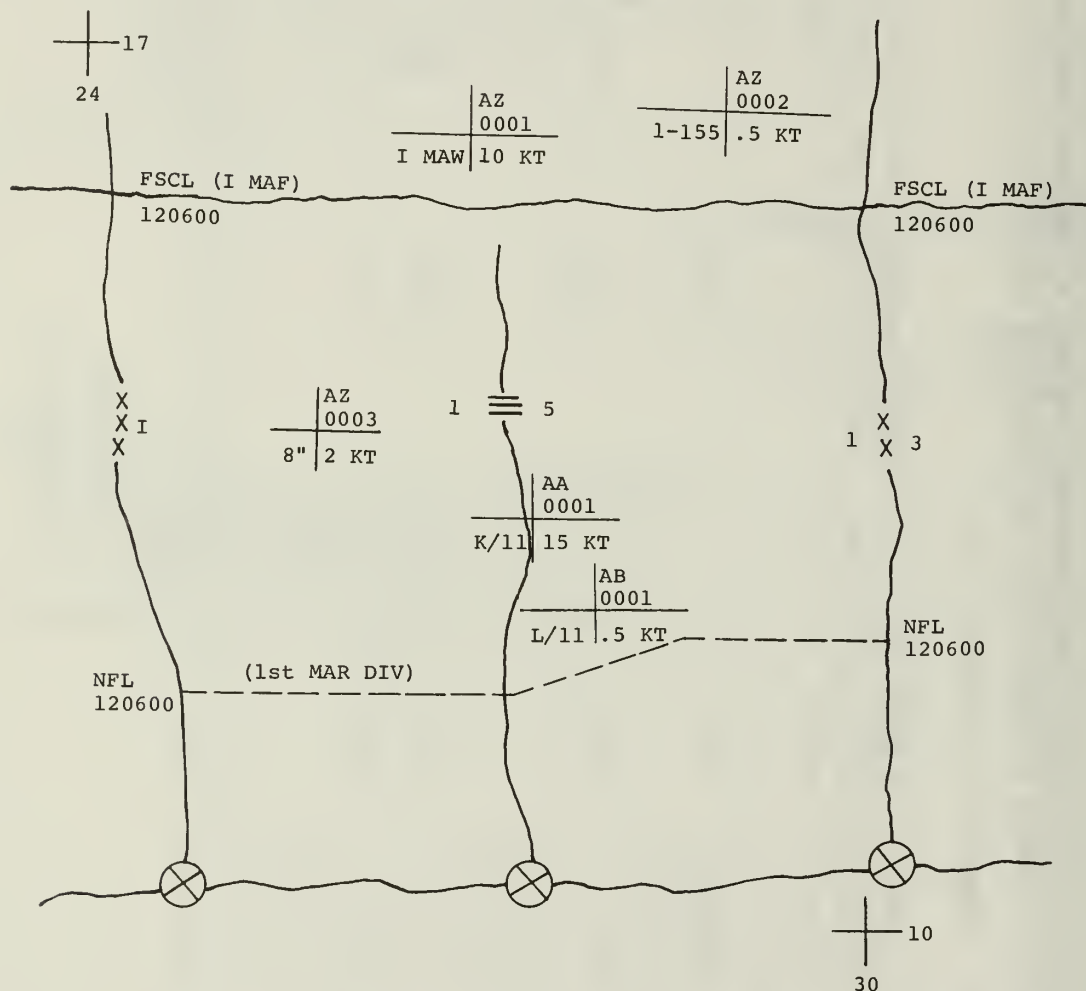
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Ref: (a) Map: Series J741, Sheets II, III



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Enclosure 3 (Weapons Readiness) to Tab E (Nuclear Fire Support) to Appendix  
 12 (Fire Support) to Annex C (Operations) to Operations Order 9-\_\_

UNIT	YIELD	STATE OF READINESS	
		I	II
11th Marines	0.5 KT	6	3
1st 8" How	1 KT	2	1
	2 KT	3	1
1st 155mm	0.5 KT	2	1
1st MAW	Air 5 KT	1	
	10 KT	1	
	20		1
	50		1

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## APPENDIX E

## SAMPLE SPECIAL AMMUNITION LOGISTICS APPENDIX (DIVISION)

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Appendix 7 (Special Ammunition Logistics) to Annex D (Logistics) to  
 Operation Order 9-\_\_

Ref: (a) Map: Series J741, Sheets II, III  
 (b) I MAF OP Order 15-7  
 (c) DivO 4000.16 (SOP for Special Ammunition Logistics)

Time Zone: ZULU

1. DISTRIBUTION. The following distribution of special ammunition applies:
  - a. Special Ammunition Load
    - (1) 155mm Batteries:  $\frac{0.5 \text{ KT}}{4}$
    - (2) 8" Batteries:  $\frac{1 \text{ KT}}{3}$        $\frac{2 \text{ KT}}{4}$
  - b. Special ammunition stockage: Remainder of assignment is stocked in SASP 1.
  - c. Unit distribution throughout period of assignment in accordance with reference (b).
  - d. No replenishment available until D+4. At that time, replenishment rate will be one round for each two expended.
2. STORAGE. Each firing unit establish field storage site. Quantity/distance and minimum spacing requirements in accordance with reference (c).
3. SECURITY
  - a. Each nuclear capable firing unit will be augmented with one rifle platoon to provide additional security at firing positions.
  - b. Emergency destruction in accordance with reference (c). Emergency destruction materials will accompany nuclear weapons during movement. Firing circuits for emergency destruction will be installed at firing units but charges will not be primed.

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4. TRANSPORTATION

- a. Preferred method for movement of nuclear weapons is by helicopter with truck convoy as the alternate means.
- b. Nuclear delivery units provide list of personnel authorized to receipt for nuclear weapons to Div G-4.

5. MAINTENANCE

- a. Required maintenance performed by contact team from FLSG.
- b. Nuclear capable units conduct partial storage monitoring in accordance with reference (c).

6. REPORTS

- a. Report expenditure of nuclear weapons through command and ammunition channels.
- b. Report receipt of nuclear weapons to G-4 via admin/log nets to include result of receipt inspection.
- c. Operational Change Report (OCR) originated at Division level.

ACKNOWLEDGE RECEIPT

BY COMMAND OF MAJOR GENERAL HOTEL

I. J. KEEN  
Colonel, U.S. Marine Corps  
Chief of Staff

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## APPENDIX F

## FORM FOR BATTALION OPERATION ORDER

NOTE: The battalion operation order may be issued orally, or written, using the following format as a guide or checklist. Fragmentary orders may be issued when there is insufficient time to issue a complete order to all subordinate units. Fragmentary orders are clear and concise and contain all essential information. They must be supplemented as soon as possible by additional instructions by conference, additional messages, or as a complete order. Items which are not pertinent to the situation or are adequately covered by SOP's should be omitted. Written confirmation of orders issued by other means should be disseminated as soon as possible.

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No change from oral orders.

(Or) No change from oral orders except . . . .

(If no oral orders have been issued or if this is an operation plan, this remark is omitted.)

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Issuing headquarters

Place of issue

Date/time of issue

Message reference number

Operation Order \_\_\_\_\_

Ref: (a) Map:  
(b)  
(etc.)

Time Zone:

Task Organization: (If a previously established task organization is to remain in effect, or is changed only slightly, remarks such as "No change" or "No change except...." are entered after this caption. Artillery battalions will not normally utilize a separate annex for this purpose.)

## 1. SITUATION

- a. Enemy Forces.--(Information concerning the enemy with particular emphasis on hostile artillery elements. Composition, disposition, locations, movements, estimated strengths, identifications, and capabilities may be included. If the information is extensive, it may be placed in an intelligence annex and referenced.)

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- b. Friendly Forces.--(Information pertaining to higher, adjacent, and supporting units, but not including information pertaining to attached or organic artillery elements of the command. Both infantry and artillery units are discussed; however, emphasis is placed on artillery units capable of influencing the operation of the command.)
- c. Attachments and Detachments.--(Attachments and detachments to and from the command as a whole may be indicated here, together with the times or conditions of attachment and detachment, or reference may be made to the task organization.)

## 2. MISSION

(A statement of the mission to be accomplished by the battalion, such as: direct support, general support, general support-reinforcing, or reinforcing. State the mission in relation to the plan of the supported unit; or when a reinforcing battalion, the plan of the reinforced unit and supported troops, including the date and time of attack, objective, and direction of attack.)

## 3. EXECUTION

(State briefly the concept of the operation and assign specific tasks to each element of the command charged with the execution of tactical duties in separately lettered subparagraphs.)

- a. Concept of Operation.--(State the concept of operation for the artillery battalion including the preparation, zone of fire, priority of fire, and zone of observation. State limitations of priority of fires as to the duration in hours or days, or for the entire operation or a specific phase. Emphasize the use of special weapons and chemical employment of the command. Specify available reinforcement of battalion fires including naval gunfire.)

(NOTE: Tasks for Subordinate Units.--Tasks are assigned to subordinate units in separately lettered subparagraphs in alphabetical or numerical sequence. The headquarters battery and its organic elements are assigned tasks in the order of preference or importance to the operation.)

- b. Battery A

- (1) (Fire support task.)

- (2) (Landing beaches, positions, primary direction of fire, zone of fire, etc.)

- c. Battery B

- (1) (Fire support task.)

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## CLASSIFICATION

- (2) (Landing beaches, positions, primary direction of fire, zone of fire, etc.)

d. Battery C

- (1) (Fire support task.)
- (2) (Landing beaches, positions, primary direction of fire, zone of fire, etc.)

e. 2d 175mm Battery, FMF

- (1) (Fire support task.)
- (2) (Landing beaches, positions, primary direction(s) of fire, zone of fire, etc.)

f. Headquarters Battery (Rein)

Headquarters Battery, \_\_\_\_\_  
CMR Team, Headquarters Battery, \_\_\_\_\_ Marines

- (1) (Appropriate support mission.)
- (2) (Landing beaches, positions, radar orientation and direction, and zone of fire.)

g. Coordinating Instructions--(Instructions applicable to two or more elements of the battalion.)

- (1) (Coordinating dates and times.)
- (2) (Firing chart.)
- (3) (Registration and registration points.)
- (4) (Survey instructions.)
- (5) (Meteorological data.)
- (6) (Instructions to forward observers.)
- (7) (Air observation.)
- (8) (Target number allocation.)
- (9) (Counterbattery-counter mortar policy.)
- (10) (Ammunition restrictions.)
- (11) (No-fire line.)

Page number

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## CLASSIFICATION

- (12) (Nuclear fires.)
- (13) (Movement instructions, including order of march, route, and release point.)
- (14) (Location, time of arrival of batteries at release point, and marking of routes.)
- (15) (Camouflage and blackout instructions.)

## 4. ADMINISTRATIVE AND LOGISTICS

(Instructions pertaining to administrative and logistic matters such as rations, ammunition, service elements, supply points, availability and rates of supply, and location of medical aid station. Assignment of available supply rate should be stated for each type artillery weapon organic or attached to the battalion.)

## 5. COMMAND AND SIGNAL

(Instructions pertaining to communications-electronics matters are covered in appropriate subparagraphs to include the plan of communication, responsibility for wire laying, and restriction on radio traffic. A communication plan may be prepared as an annex and referred to here. The appropriate COMMSOP and COI's may be referred to as required. Location of command post of the battalion is stated, when available, and subordinate unit command post locations may be designated in this paragraph. Time checks and synchronization of watches is covered in this paragraph. Communication center and march control point locations are included when necessary.)

BY COMMAND OF LIEUTENANT COLONEL WHITE:

B. B. BLACK  
Major, U.S. Marine Corps  
Executive Officer

## ANNEXES:

- A - Task Organization
- B - Intelligence
- C - Operations
- D - Logistics
- E - Personnel
- K - Communications-Electronics
- L - Operations Security
- M - Movement
- N - Rules of Engagement
- P - Air Operations
- R - Amphibious Operations
- Y - Reports
- Z - Distribution

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## APPENDIX G

## FORM FOR UNIT REPORT FOR ARTILLERY UNITS

## CLASSIFICATION

Copy no. \_\_\_ of \_\_\_ copies  
Issuing headquarters  
Place of issue  
Date/time of issue

Unit Report Number \_\_\_\_\_

Period Covered: (DTG) to (DTG), (mo & yr)

Ref: (a) Map:  
(b)  
etc.

## 1. ENEMY

(Artillery and mortar units in zone action, artillery activities, shellings of our friendly positions, batteries and pieces located during period. New identification of artillery and mortar units, estimated enemy casualties caused by our fire, estimate of enemy nuclear delivery capabilities.)

## 2. OWN SITUATION

(Location of artillery units at end of period, displacements, tactical mission assigned and any changes during period, any special events, estimate of combat efficiency; attach copy of Record of Fire Missions (S-3 worksheets).)

## 3. PERSONNEL

(Attach daily summary, replacements, casualties suffered, POW's captured, disciplinary record and problems, estimate of unit morale.)

## 4. LOGISTICS

(Status of supply classes I, III, and V; critical shortages of classes II or IV; status of motor transport; any medical and evacuation problems; condition of roads in area; estimate of units' logistic capabilities for continued combat action.)

(Signature)

Name

Rank

Position

Page number

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ANNEXES:

- A - Record of Fire Missions (S-3 Worksheet)
- B - Personnel Daily Summary

DISTRIBUTION: C

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## APPENDIX H

## FIELD ARTILLERY PW INTERROGATION CHECKLIST

The following checklist contains the type questions that provide answers to artillery essential elements of information (EEI's). This form may be utilized by interrogation teams provided by the landing force intelligence section or by an artillery intelligence representative.

## 1. ARTILLERY AND NONARTILLERY TYPE PRISONERS OF WAR

a. Hostile Batteries

- (1) Were there any guns in the area where you were captured?
- (2) What number, type, and caliber of guns or batteries?
- (3) Do they possess a nuclear capability?

b. Location of Hostile Batteries

- (1) Can you give the location of any battery on this map (photograph)?
- (2) How long have the positions been occupied?
- (3) Are the guns dug in? To what extent?
- (4) Do they move at night?
- (5) Do they move often? By what means and routes?
- (6) Do they displace by individual piece or by battery? At night? Or during hours of daylight?
- (7) Where are large caliber weapons located in relation to the other artillery and the frontlines?

c. Artillery Policy

- (1) Have the guns fired recently?
- (2) What is the ammunition situation? Type and amount?
- (3) Have you seen any ammunition dumps? Near the guns or to the rear? How much? Security measures?
- (4) Do the guns fire at night? By piece or battery? How often?
- (5) Do they occupy and fire from one or several positions? At night? During the daylight hours?
- (6) Do they fire from caves or deeply revetted positions more than from positions in the open with normal cover and concealment?

- (7) How often do they receive ammunition? By what means? Where from and over what routes?

d. Deception

- (1) Have you seen any dummy positions? Single gun or battery? Locations?
- (2) What extent are they developed? Camouflage, roving gun positions, flash and noise?
- (3) Do they coordinate flashes in dummy positions with missions fired at night from actual positions?
- (4) Do single guns move along the road or occupy numerous prepared positions for only one or a few fire missions?

e. Effect of Our Own Fire

- (1) Have their batteries been hit by our artillery? Where are they? When did it occur?
- (2) Were any of the guns destroyed or damaged? To what extent?
- (3) Were there personnel casualties or destruction to equipment and ammunition? To what extent?
- (4) Were the guns repaired or replaced? How soon?
- (5) Have personnel replacements been provided? Equipment and ammunition? How soon?

f. Organization for Combat

- (1) What type and caliber guns are in your unit? Battalion? Regiment?
- (2) What types and caliber of guns are emplaced near your unit?
- (3) Do you have air defense artillery? How much? Where?
- (4) What types of rockets and missiles do you have? How many? Where?
- (5) Which of these units possess a nuclear capability?
- (6) Do you have any amphibious artillery? How much? Where?
- (7) Is any of your artillery controlled by electronics, radar, or other means? Procedures used? When and where?
- (8) What is your tactical mission and what unit do you normally support? Relationship with supported unit?

g. Fire Planning

- (1) What barrages, final protective fires, targets, programs of targets, schedules, interdiction missions did your unit have?



- (2) Where are fires planned? Method and system used?
- (3) Type of fire plans? Where delivered? When delivered? By whose order?

h. Ammunition and Equipment

- (1) Where is your ammunition supply point?
- (2) How much ammunition do you keep on the gun? In position? In the unit dump?
- (3) What types of ammunition do you have on position? In the dump? Available from other sources?
- (4) Do you have chemical, biological, and illuminating shells on position? In the dump? Available to you?

2. ARTILLERY TYPE PRISONERS OF WAR ONLY

a. Counterbattery Activities

- (1) Does your battery fire on our artillery? Fuze and ammunition?
- (2) Have you heard the azimuth to our guns or to their flash or sound?
- (3) What procedure do you use to attack our artillery? To locate it? Number of units that fire?
- (4) Do you know the actual location of our artillery? To locate it? Number of units that fire?
- (5) Are our position areas marked on your situation maps or firing charts? How is this information used?
- (6) Do you know how our artillery is emplaced? Layout? Routes?
- (7) Do you know the location of our ammunition supplies?

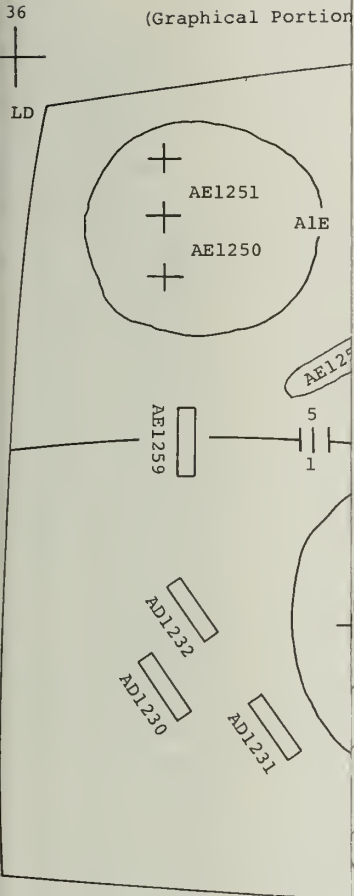
b. Gunnery Techniques

- (1) How often do you register or check your registration? Location of registration points? Procedure used and when executed?
- (2) How long does it take you to shoot after displacing to a new position area? What procedures and requirements are necessary prior to firing?
- (3) Can you mass the battery? Battalion? Regiment? How well?
- (4) Are your guns calibrated? Last time? How often? How well?
- (5) Do you get meteorological information? How is it used? How often?
- (6) Do you survey? To all guns or batteries? Forward observers? Common grid? What methods are used?



SAM

(Graphical Portion

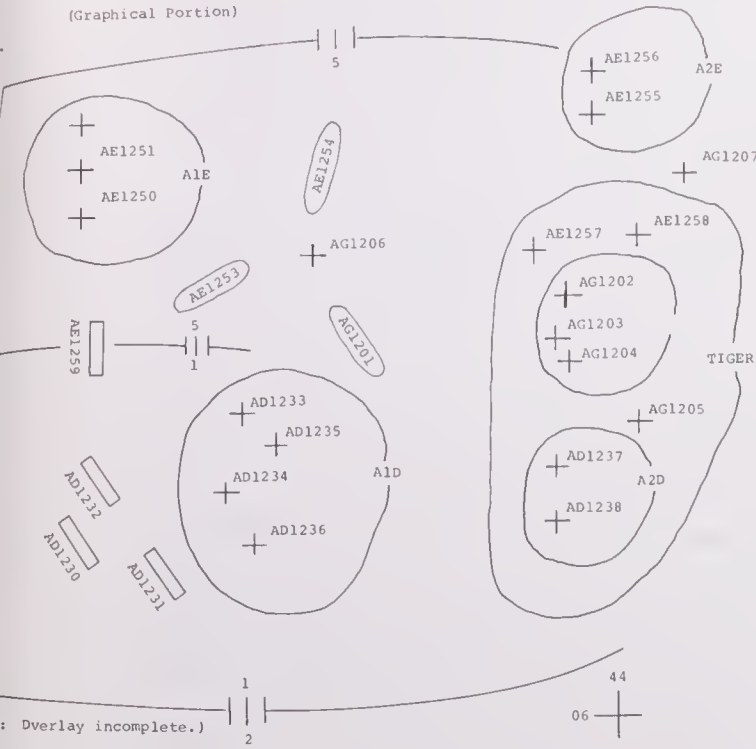


(NOTE: Overlay incomplete.)

1. The example above shows to support the attack of an
2. All fires planned to support fires and series of fires. Information such as boundaries, graphical portion.
3. In the offense, fires are on suspected enemy targets (fires). The planning of fires the rifle company commander
4. In the defense, fires are approach into the battle position depth throughout the battle
5. Show map tick marks for
6. Each target is designated 100 meters must be outlined

APPENDIX J

SAMPLE ARTILLERY FIRE SUPPORT PLAN  
(OVERLAY TECHNIQUE)



The example above shows the graphical portion of the artillery fire plan support the attack of an RLT.

All fires planned to support the regiment are shown here. Groups of fires and series of fires planned will also be indicated. Friendly information such as boundaries, frontlines, LD, etc., is normally shown on the graphical portion.

In the offense, fires are planned three places--on known enemy targets, suspected enemy targets, and on prominent terrain features (protective fires). The planning of final protective fires is primarily the concern of the rifle company commander assisted by the artillery FO.

In the defense, fires are again planned in three places--on avenues of approach into the battle position, on top of the battle position, and in depth throughout the battle position.

Show map tick marks for orientation of the overlay.

Each target is designated by tick marks except those targets larger than 100 meters must be outlined in size and shape.

(This information is normally published on overlay paper with graphical portion of artillery fire plan)  
--(Copy Number)--  
--(Issuing Headquarters)--  
--(Place of Issue)--  
--(Date/Time of Issue)--  
--(Message Ref Number)--

Tab B (Artillery Fire Support) to Appendix 12 (Fire Support) to Annex C (Operations) to Operation Order 9--

- Plan of maneuver of supported unit. (Not necessary but may be shown if desired.)
- Priority of fires.
- Requests to higher headquarters to fire certain targets. For example: "Request heavy artillery fires continue neutralization counterbattery targets from H-15 to H-hour."
- Request to higher headquarters for coordination and clearance of fires planned outside of zone of the supported unit or short of another unit's no-fire line.
- Instructions to firing units concerning the delivery of scheduled and on-call fires. For example:

"Btry E be prepared to smoke AE1255 on call."  
"2d 8" How Btry fire destruction mission on AG1206 at H-30. AD will observe."  
"During preparation fire HE, fz delay, converged sheaf on all bunkers."

(NOTE: There is no standard number of paragraphs or sequence of information prescribed. Include in the marginal information any data deemed pertinent and necessary for the recipient of the fire plan to understand it. The artillery fire plan may be provided as a part of the artillery unit and/or the supported maneuver unit operation order.)

DISTRIBUTION:

OFFICIAL

ARTILLERY LIST OF TARGETS

Target No.	Target Description	Target Coordinates	Altitude (Meters)	Size (Meters)	Azimuth/Bearing	Source	Remarks
AD1232	Dug-in Plat	37951032	226	100x400	1540	API	Scheduled
AE1255	OP	43801305	197		1450		Smk On Call
AE1256	Suspect CP	43891310	195	200x600	1400	PW	Reg Regt TDT
AG1201	Supply Dump	42931100	217	250x600	1610		WP and HE
AG1206	AT Gun	40980954	202		1480	API	Reg Hvy Arty

- NOTE: (1) All fires planned to support the supported unit will be shown in the list of targets. All targets listed are available to be fired on call as well as stated in the fire plan.
- (2) The remarks column indicates the disposition made of or to be made of a target; i.e., on call, scheduled, etc.
- (3) These examples are incomplete.

ARTILLERY FIRE PLAN TABLE

	-18	-16	-14	-12	-10	-8	-6	-4	-2	H	+2	+4	+6	+8
BTRY D	AD1232 64		AD1231 48		AD1230 48		AD1231 74		AD1232 64		AD1230 48	AD1231 48		
BTRY E		AE1252 64		AE1251 64	AE1250 40		AE1251 64		AE1259 64		AD1253 96		AE1259 48	
BTRY F	AD1233 48		AD1236 48		AD1235 48		AD1234 74		AD1230 64	AD1237 48		AD1238 48		
BTRY M		AE1256 48		AE1255 48		AE1257 48		AE1253 64		AE1254 64		AE1258 48		
2d8" HB	AG1205 32		AG1202 16		AG1204 16		AG1203 16		AG1206 32		AG1207 16	AG1206 16		

- The schedule is blocked out for the appropriate time length in 2-minute blocks for each firing unit. In the above example, the preparation starts at H-18 and continues until H+8.
- For each target to be fired on, the following is indicated in the schedule.
  - The short line indicates the starting time for firing at the target and the time the firing must be completed.
  - The target number is shown above the line.
  - The number of rounds to be fired on the target is shown below the line.
- An appropriate time interval must be left between scheduled firing to accomplish two things: (1) to allow the tubes to cool and (2) to allow time for the unit to shift to the next target. This interval is normally 2 minutes but may be 1 minute in some instances and more than 2 minutes in others. The firing should be staggered so that a pattern of firing will not be evident.
- Additional schedules of fires may be prepared to be fired on call or upon the happening of a certain event during the operation. For example, a schedule of fires may be prepared to be fired on call when and if needed.

GROUPS OF TARGETS									
UNIT	A1D	A2D	A1E	A2E	A1G	A2G	A3G	A1H	A2H
Btry D	AD1234	AD1237	AE1250			AG1241			
Btry E	AD1235		AE1252	AE1256	AG1204	AG1243			
Btry F	AD1233	AD1238	AE1251	AE1255	AG1202	AG1244			
Btry M	AD1236	AD1237			AG1203	AG1246	AG1250	AH1313	AH1311
2d8" HB		AD1238				AG1242	AG1251	AH1312	AH1310

- Groups of fires are planned to cover a single tactical locality too large to be covered by a single target number.
- Each target within a group of fires is assigned to a separate firing unit (battery or battalion).
- Targets may be made into groups of fires without regard to the agency planning the fires.
- Groups of fires are fired on call.
- The artillery S-3 will plan the groups of fires.



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 FMFM 4-2, Amphibious Embarkation  
 FMFM 4-6, Air Movement of FMF Units  
 FMFM 5-1, Marine Aviation  
 FMFM 5-4, Offensive Air Support  
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 FMFM 6-2, Marine Infantry Regiment  
 FMFM 6-3, Marine Infantry Battalion  
 FMFM 6-4, Marine Rifle Company/Platoon  
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 FMFM 7-2, Naval Gunfire Support  
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